THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

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Wide World Photo

Jan. 3 was the first day of business for the deregulated AT&T, and AT&T Communications' chairman and chief executive officer, R. Morris Tanenbaum, showed off the new corporate logo before flag-raising ceremonies at national headquarters in Basking Ridge, N.J.

AT&T discounts CPE for users

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — AT&T last week began selling its entire base of installed terminals to its users at discounts of 10% to 20%. Beginning March 1, a company spokesman said, the discounted prices will be reduced an additional 1% each month for a period of 15 months.

AT&T customers interested in buying terminal equipment presently on lease — known as customer premises equipment — should call their Business Service and Sales Center, the spokesman said. The center, which has the customer's equipment service record, will set a "ball-park price" immediately and call back later with a final price.

This procedure applies to systems containing 10 or fewer stations, the spokesman explained. A customer with 11 or more stations should call his marketing branch office. The telephone numbers of the Business Service and Sales Center and the marketing office are on the customer's monthly bill.

Asked for samples of the discounted prices for customer premises equipment, the AT&T spokesman said that installed two-line, four-station Comkey 416 terminals are being offered for $1,489.50, 10% less than the price of the same equipment new. Two-line, six-station Comkey 416s were reduced 10% (to $2,385 from $2,650); the six-line, 10-station Comkey 718 was reduced 15% and now costs $3,792 instead of $4,461.

The spokesman noted that these prices are approximate. He emphasized that the discounted sales price of a particular terminal will vary widely, depending on such factors as its age and complexity. A formula has been devised for relating the terminal's age to its sales price, but the spokesman declined to

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FYI

Why *Computerworld* looks different this week

What's different about *Computerworld* this week?

Nothing — and everything.

Everything you've found in *Computerworld* in the past is still in the same place. The latest news is still right up front, and product news is still in the technical sections. The In Depth section remains in its convenient place, the center of *Computerworld*, and continues to provide longer, thought-provoking articles on a wide range of topics. The editorial section of *Computerworld* still follows the news section, giving our readers a forum for their insights and opinions.

But a lot is different, too. We've made the wealth of information in *Computerworld* easier to access. Because our readers' jobs require them to absorb more information than ever before, we've added indexes throughout *Computerworld* to help them find that information. We'll be using informational graphics — charts and illustrations — more than ever before to convey information quickly.

The typeface of *Computerworld* is different this week, too. It's a classic newspaper typeface, designed for readability.

And to help our readers do their jobs even better, we've expanded our technical sections with columns by experts in specific fields and by users who have implemented workable solutions to their companies' problems, as well as with columns by *Computerworld*'s own editors.

Something else is new, too — we've added a technical section on microcomputers. Centralizing the increasing amount of news on microcomputers in corporate environments that *Computerworld* has been providing for the past year, the new section will be devoted to single-user and multiuser microcomputer systems, peripherals and software.

Because of the merging of office automation into the mainstream of data processing, the news contained in the former Office Automation section has been folded into the other technical sections. If you're looking for information on electronic mail software, for example, you'll find it in the Software and Services section; local-area networks are now covered in the Communications section.

The move to a new look for *Computerworld* actually began more than a year ago, when our editors began to meet with groups of readers around the nation. After discussing the current state of the DP executive's profession and the time pressures he faces on the job every day, these readers asked us to continue giving them all the news we have been giving them, but to make it quicker and easier to get at.

Computerworld's updated look is the result of six months of work by Robert Lockwood, regarded as one of the foremost newspaper designers in the U.S. His credits include *The Christian Science Monitor, Chicago Sun-Times, Allentown Morning Call, Philadelphia Bulletin, Dallas Morning News* and *Baltimore Sun*, among others. The founder and first president of the Society of Newspaper Designers, Lockwood worked with a redesign committee made up of members of the *Computerworld* editorial and production staffs.

The updating of *Computerworld* represents our commitment to serve our readers' needs as they change. We think you'll agree.

AT&T plans high-speed data on voice lines

By Jim Bartimo
CW Staff

MURRAY HILL, N.J. — Computers will be able to communicate at high speeds over the same lines used for telephone calls when AT&T's Circuit Switched Digital Capability (CSDC) is implemented in more than 12 cities by the end of this year, the company announced recently.

Calling it a "giant step" toward the totally integrated networks often referred to as integrated services digital networks (ISDN), the newly deregulated AT&T said CSDC will allow companies to send nearly all business communications over conventional phone lines. This data includes voice, graphics and data.

"We're definitely moving toward an ISDN with this," an AT&T spokeswoman said.

Developed by Bell Laboratories, CSDC will allow users to alternate between analog voice calls and digital data transmissions with the touch of a button. Speeds of 56K bit/sec will be achieved for data, AT&T claimed.

The system is now undergoing a trial at the New Jersey Bell switching center here. Initially, the capabilities of CSDC as a high-speed computer connection and as a bulk data carrier will be tested.

Local telephone companies will install the CSDC equipment, which can be interconnected by long-distance networks of various interexchange carriers.

In addition to bulk data transfer, CSDC's 56K bit/sec digital transmission speed will also allow for teleconferencing, encrypted voice and high-speed facsimile at speeds of 4 sec/page.

CSDC consists of a software package for the Western Electric 1AESS switching system, additional hardware for the switch, modifications to the local telephone lines and some additional equipment at the customer site.

Switching from voice to data

To use the network, customers dial into the service with a five-digit code, then dial the site where the transmission is being sent. Once a call is established, the connection can be alternated between voice and data transmission, AT&T said.

When a customer sends data from a computer, hardware installed at the customer's office permits two-way digital communication over the wire pair running between the customer's site and the central telephone office.

CSDC allows simultaneous, two-way traffic by alternating the signals going in each direction and sending them at high speeds. To accomplish this, a time compression multiplexer is used to send and receive alternately bursts of data. Multiplexers are installed at both the telephone office and the customer's premises, according to AT&T.

Rather than send signals in both directions at 56K bit/sec, the multiplexers send signals at double that rate, but alternate between sending and receiving more than 700 times per second. According to AT&T, this process make it appear to the user that data is moving in both directions simultaneously.

CPE

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disclose it.

Asked whether a customer could request AT&T to visit his site and examine his customer premises equipment before pricing it, the spokesman said some site visits will "undoubtedly" be made, but the AT&T representative will decide when they are necessary.

Customers who prefer to continue leasing their present equipment can do so for the next two years at specified rates. Until next March 1, according to the spokesman, 1983 charges will continue. After that date, the monthly fee will be based on a "national lease rate," separately calculated for each product category.

The national lease rate is equal to either 70% of the highest state-tariffed charge in effect at the end of 1983 for that product line or the median of all state-tariffed rates in effect at the end of 1983 for that product line, whichever is higher. If a customer has been paying less than the national lease rate, his monthly charge after March 1 will be increased in stages over the following two years until it reaches the national level.

New rate March 1

Customers who have been paying more than the national lease rate will begin paying the new rate March 1.

The selling and leasing of AT&T's embedded terminal base is administered by AT&T Information Systems, the telephone company's deregulated subsidiary. Under the AT&T divestiture agreement, all installed, leased AT&T terminals, along with the terminal marketing and service centers, were transferred from the erstwhile Bell operating companies to the subsidiary on Jan. 1.

Prior to last week, AT&T had said it would offer only about 75% of its embedded terminal base for sale this year. Under the terms of a plan proposed to the Federal Communications Commission early last year, the company could have waited until Jan. 1, 1986 to announce prices for the remaining 25% — which included popular models of electronic private branch exchanges, key telephone, modems and data terminals.

This scheme would have been hard on users because, without knowing what it would cost to buy their installed equipment, the users could not accurately determine whether to replace or retain that equipment.

Last November, however, the FCC ruled that AT&T, after posting a sales price for a particular type of embedded terminal equipment, would have to lease it for two years at the national lease rate.

Nata raps Mountain Bell's Centrex offer

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Mountain Bell Telephone Co. was accused last week of flouting the Federal Communications Commission's Second Computer Inquiry decision.

Mountain Bell's accuser is the North American Telecommunciations Association (Nata), whose members include independent manufacturers of private branch exchange equipment that competes directly with Centrex.

The dispute goes back to last March, when Nata complained that Mountain Bell, along with other Bell operating companies, had begun offering "enhanced" Centrex equipment directly despite the FCC's Computer Decision II, which says that such services, if offered by telephone operating companies, must be marketed through separate, deregulated subsidiaries.

The association has been trying to persuade the commission to issue a ruling that "Centrex service may not be expanded to provide enhanced service."

Among those involved in the controversy is the International Communications Association (ICA), a major communications users group.

The heart of Nata's petition is that Computer Decision II bars any addition to network-provided Centrex services beyond those offered in 1980, when the decision was adopted, ICA told the commission last month. "Centrex service is a significant revenue source for local telephone companies," ICA said, adding that if the Nata proposal to freeze enhancement of Centrex were granted, it "would destroy the economic and operational viability of Centrex service . . . The severe dislocation of existing Centrex customers cannot be overemphasized. . . . Moreover . . . there is simply no way companies could have effective communication systems if the relief Nata requests is granted."

The latest chapter in this controversy began last week, when Nata and other interested parties submitted "reply comments" to the FCC covering issues raised in earlier filings. According to Nata, Mountain Bell is offering "Centron 300" service on a tariffed basis in Colorado and on an untariffed basis in Utah. Nata contends that Centron is an enhanced Centrex service that includes automatic route selection, multilevel facilities restriction and automatic overflow to dial-up facilities.

The association's filing includes a Sept. 23, 1983, letter from a Mountain Bell official, Paul B. Dorius, to the Utah Public Service Commission, which said, "It is Mountain Bell's position that since Centron is directly competitive with the offerings of nonregulated terminal equipment vendors, there is no legal or public policy basis for requiring that Mountain Bell's Centron offering be tariffed."

According to Nata, this position contradicts the one Mountain Bell has taken in its comments to the FCC — that Centron is a "basic" service as that term is defined in the commission's Computer Decision II.

"At a minimum," Nata told the commission last week, "Mountain Bell's inconsistent representations . . . indicate . . . considerable uncertainty regarding . . . the parameters of the Computer [Decision] II as it pertains to Centrex." The association added that this same uncertainty underlies the enhanced Centrex offerings of other telephone companies.

Bug causes broadcast of nuke alarm

By John Gallant
CW Staff

HARRISBURG, Pa. — A mishap during the installation of a computerized emergency warning system at Pennsylvania Emergency Management Agency (Pema) headquarters here last week set off a nuclear attack warning that was broadcast to police and Civil Defense (CD) authorities in 41 of the state's 67 counties.

At 11:15 a.m on Wednesday, the following message came over teletypewriters in police radio rooms and CD headquarters: *This is an attack warning. Supplemental information will be provided when available. Take appropriate action.*

Authorities in Lehigh County moved quickly, transmitting the message of imminent attack to emergency personnel and sounding fire sirens throughout the district. But Lehigh was the only county to carry that warning all the way to the public, according to Pema Press Secretary John Comey. Within five minutes of the nuclear attack alert, officials in the other counties received notice telling them to ignore the broadcast.

The faulty warning was the result of a botched transfer between floppy disks of "canned" emergency messages during the installation of a new computerized AT&T emergency teletypewriter system, Comey said. "Somehow, the message was transmitted rather than duplicated," Comey said. "For reasons unknown as of now, the nuclear attack warning was broadcast to the counties that were already on-line with the new system."

The system, scheduled to be fully on-line at the end of last week, will be part of the nationwide Emergency Warning System. Comey said that the nuclear alert message was caught before the statewide Emergency Broadcast System could be activated.

In Allegheny County, according to Police Inspector Leonard Jackson, officials had begun to notify emergency personnel when the disregard notice came through.

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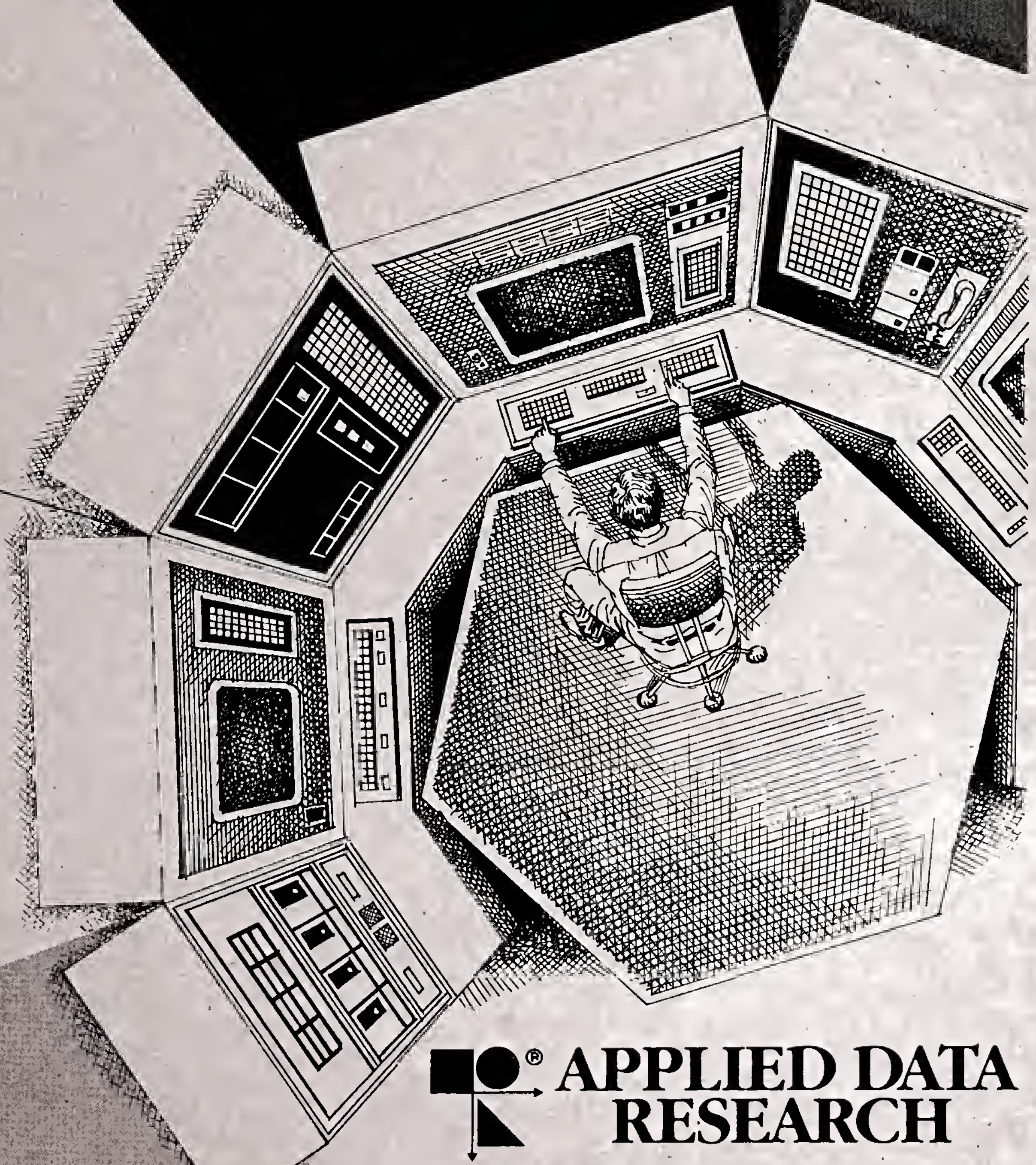

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Firm makes 'Ideal' choice after PL/I

1ST USER

By Paul Gillin
CW Staff

WESTWOOD, Mass. — The F. W. Faxon Co., a library serials management firm based here, prides itself on flourishing in a market that has been a graveyard for many companies. While more than 80% of its competitors have failed over the years, Faxon has achieved $200 million in annual sales, with a steady 25% growth rate.

The company attributes much of that success to keeping up with the technological Joneses. Faxon installed its first computer in 1953. Now, with most of its library services on-line, the company runs 280,000 transactions daily on its IBM 3081 Model D mainframe.

Faxon acts as an intermediary between publishers and subscribers, most of which are academic and business libraries. Some of its more than 25,000 clients subscribe to 100,000 publications. Among the services Faxon offers are subscription management, on-line serials check-in, checks on undelivered copies, union list management for libraries that share resources and a routing service.

Company expansion and the dramatic growth of the publishing industry in recent years led Faxon to seek an alternative to PL/I for its programming work. Following an evaluation that included Cullinet Software, Inc.'s IDMS data base management system (DBMS) and related application development facilities, Faxon late last year became the first user of Ideal, an integrated fourth-generation application development system from Applied Data Research, Inc. (ADR) of Princeton, N.J. Faxon also purchased ADR's Datacom/DB DBMS, Dataquery, Datareporter and Datadictionary.

Although Ideal is oriented toward programmers, its first user at Faxon was an analyst with no programming experience. "I found that once you have detailed specs, the Ideal products lend themselves well to translation to the actual set of code," said Jeff Phillips, a section head in the technical division of Linx, Faxon's flagship serials management service.

Working with user David Brown, an electronic publishing consultant, Phillips coded the entire instruction set for a new "electronic yellow pages" service. Called Infoserv, the on-line, menu-driven service allows librarians to search for new serial sources by various keywords and topics and to request more information on subscriptions.

Infoserv "had an initial estimate of six months of programming time with two to three people," Phillips said. Using Ideal, Phillips and Brown coded the application in a little more than a month.

Screen painting and file definition were particularly simple, Phillips said. "We never had a screen written out or a format document."

CW Photo by P. Gillin

Although he had no programming experience, Jeff Phillips (right) of F. W. Faxon & Co. developed a project in a high-level language with help only from user David Brown (left). Now Faxon is using the language on a much larger programming project under the supervision of Alan Exon (center).

Ideal is now being exercised on a more intensive project. The Horizon project is a "mammoth order processing program for the Amsterdam office," according to Alan Exon, manager of advanced systems design. When completed this spring, Horizon will provide a full range of services for worldwide subscriptions that come from its Netherlands office.

Faxon is devoting nine full-time DP employees to the nine-month project. The goal is to write the program without using a single line of PL/I or assembler code. So far, Exon said, that goal is within reach.

Exon noted that Faxon will achieve major reductions in code using Ideal, Dataquery and Datareporter instead of PL/I programs. Allowing for reports that users can write themselves and programs not needed by the Amsterdam office, he estimated that 100,000 lines of Ideal code will be needed to provide roughly the same functions as two million lines of PL/I.

Because the final project will probably include 200 or more screens, Ideal's ability to prototype has been a lifesaver, Exon said. "The user doesn't have the patience to read 150 pages of specs," he said. "Ideal is wonderful for producing panels very fast. This project would be extremely difficult to create without prototyping."

Exon called Ideal's full screen editor and compilation speeds "very fast" and praised the software's ability to execute several commands on a screen simultaneously. "You can change a country code and then immediately back out to the menu and go to another panel, all in the same transaction," he said.

The product also allows Faxon to do concurrent batch processing and real-time updating of Datacom/DB indexes, he said.

However, Exon admitted that Faxon has undergone some "growing pains" as a first user. "Programming Help panels can be tedious," he commented. "String functions are inadequate, and Ideal's [procedure definition language] in some cases is verbose for the sake of clarity."

Another shortcoming of Ideal, according to Exon, is its lack of an interactive debugger. "Now you have to write your own exhibit statements, and when you debug you have to go back and recompile and relink. The perfect solution would be a language you can run in interpretive mode for interactive debugging, could edit at any point and re-execute at any point."

Fledgling info center goes up with 'Peachpak II'

1ST USER

By John Gallant
CW Staff

BATON ROUGE, La. — The first user of Management Science America, Inc.'s (MSA) Executive Peachpak II micro-to-mainframe link has successfully implemented the software as part of a fledgling information center, though end users are currently allowed to utilize only the downloading capabilities of that package.

Announced at MSA's Interact meeting in September, Peachpak II was designed to accommodate on-line data base sharing between mainframes and the IBM Personal Computer. The package was said to allow for the downloading and uploading of mainframe files in MSA applications for manipulation on any microcomputer application utilizing Software Arts, Inc.'s Data Interchange Format.

The first user, Fidelity National Bank here, has operated Peachpak II in a test environment since mid-October and in full production mode since early December. According to Glen Smarada, assistant vice-president and programming manager, Fidelity is using the package on two IBM Personal Computers in the bank's Accounting Department. The micros are linked to Fidelity's IBM 4341 Model Group 2 mainframe through a coaxial network utilizing Technical Analysis Corp.'s Irma boards.

Smarada said the decision to go with the MSA micro-mainframe link was a natural outgrowth of the DP department's goal of helping end users utilize "their own data." Early in 1983, management implemented policies on microcomputer acquisition and use and created an information center that has since attempted to standardize hardware and software selection throughout the organization. Through the information center, Fidelity purchased 25 micros, most of them IBM Personal Computers, and the first version of Executive Peachpak.

"We run several MSA applications on the mainframe, including human resources, fixed assets, accounts payable and their financial package," Smarada said. "We wanted something to interface with their financial package, and Executive Peachpak, which we installed in April 1983, was an exact match."

While the original version of the software resided only on the micro, Peachpak II required, in addition, the installation of several host programs to accommodate the data base sharing function, an undertaking that, Smarada said, was "quite simple" with MSA's assistance. More important, he said, users have had little trouble learning to use the system.

"Users used to have to take information from a variety of reports and load it into spreadsheets," Smarada said. "Now they can just download that data directly into the micro applications. That has saved these people quite a bit of time. Also, that capability has made them realize the many additional things they can do with the information available. People are producing things that were just 'blue-sky' before."

Fidelity's users are currently employing only two microcomputer applications with Peachpak II — MSA's Peachcalc spreadsheet and Lotus Development Corp.'s Lotus 1-2-3 spreadsheet package. The MSA micro-mainframe link allows data to be downloaded directly into those applications without the need for a reload at the micro level. Also, "all security is handled on the mainframe level," Smarada said. "You have to utilize the same passwords you would on a terminal. We were very concerned about security, but we're finding it to be more than adequate."

That concern for data security is one of the factors behind Fidelity's decision not to allow any uploading of data to the mainframe. "We want users to become familiar with the retrieval aspects of the system first."

Smarada said Fidelity may begin to utilize Peachpak II's uploading capabilities in the near future. The bank also plans to expand the use of micros to its 17 branches and to allow users in the Human Resources Department to take advantage of Peachpak II within the next year.

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IBM picks Comshare DSS for Info Center

Seen as endorsement of 'System W'

By Paul Gillin
CW Staff

ANN ARBOR, Mich. — Comshare, Inc. last week announced a two-year "complementary marketing" agreement with IBM, whereby IBM will recommend Comshare's System W and Micro W decision support system (DSS) software for use in IBM Information Centers. It is the first time IBM has concluded such an agreement with a DSS vendor.

While both companies stopped short of calling the deal a joint marketing agreement, sources said the announcement amounts to an endorsement of System W by Big Blue.

Under the terms of the agreement, IBM and Comshare field representatives will conduct joint sales calls on customers who are interested in DSS, a Comshare spokesman said. IBM sales representatives will also refer interested prospects to Comshare for DSS applications rather than referencing three alternative vendors, as has been the company's practice in the past. However, IBM will continue to recommend alternative vendors if the customer requests that information, an IBM spokeswoman said.

The agreement also provides for IBM and Comshare to work together on future enhancements of System W to support new IBM hardware and software. Comshare will have full responsibility for providing, installing and supporting System W and will offer education and custom programming services for the software, Comshare said.

'We are their experts'

"We are their [IBM's] experts in decision support," said Richard L. Crandall, Comshare's president.

"It's the biggest thing we've ever done," he added. "The DSS market has been as confused and factionalized as the personal computer market was before IBM came in. People want leadership, and IBM is providing it."

But an IBM spokeswoman emphasized that the deal should not be construed as a joint marketing agreement or an endorsement.

"For one thing, we are not marketing System W. The reps will go together to sales prospects," she said. "We also do not endorse other vendors' software products."

Major step for Comshare

However, the deal will clearly be a major boost to Comshare, which introduced System W as packaged software just over a year ago. "It's a meteoric rise, a true success story," said Len Bergstrom, vice-president of Real Decisions Corp. in Stamford, Conn., which publishes a DSS report. "We've been watching System W for a long time. It's always been presented and packaged very well. We look at it as being very successful."

Bergstrom added that users will be the "real winners" in the wake of the agreement. "IBM's endorsing DSS will give it some momentum," he said. "We see a lot of clients wanting bundled packages. And the DSS concept is very well tied to the Information Center concept."

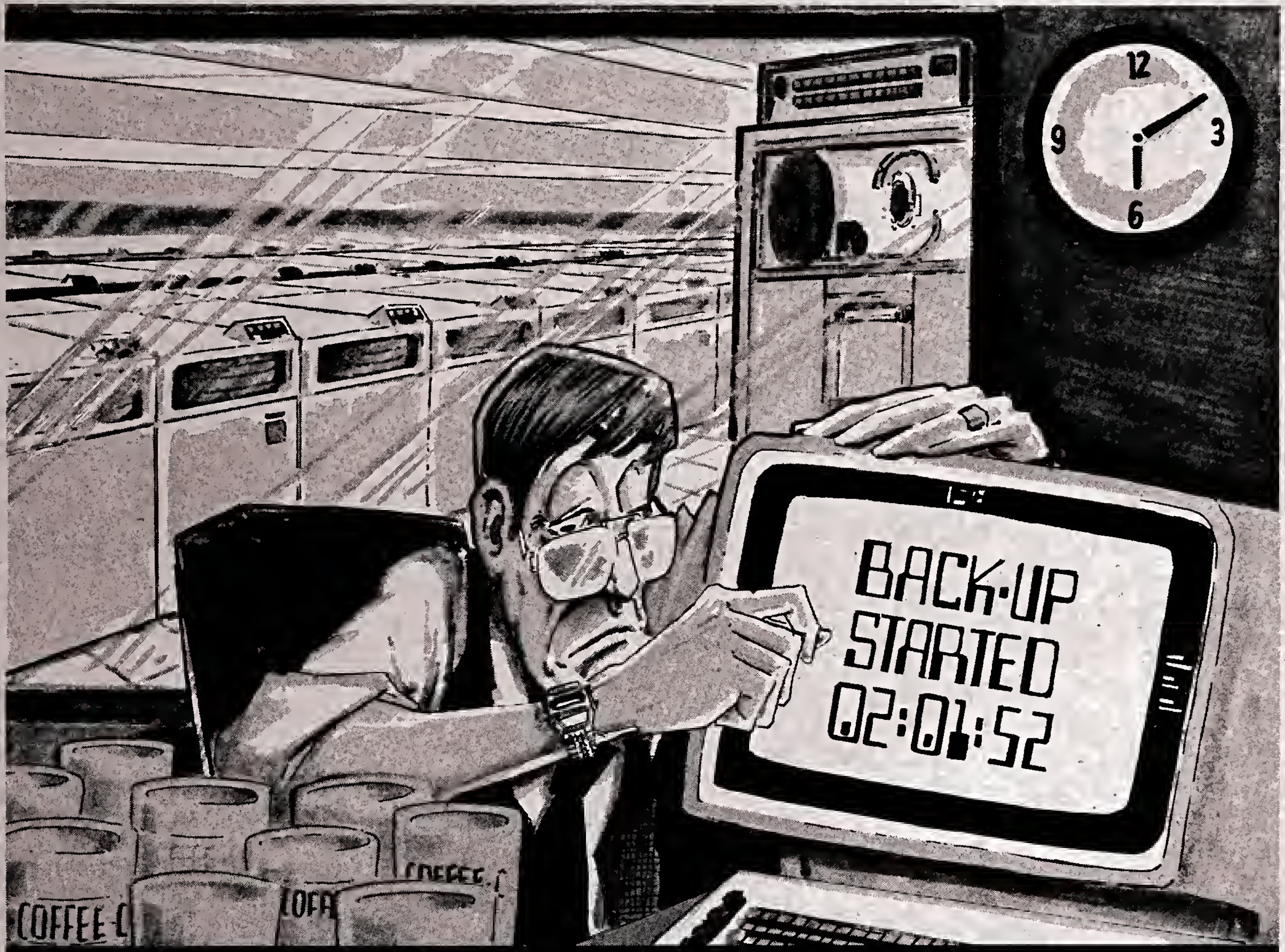
While admitting that he was "envious" of Comshare's success, a spokesman for Execucom, Inc., which markets the IFPS DSS, downplayed the significance of the deal. "I sum it up as a nonagreement," said Gary Greenfield, Execucom's vice-president of technology. "The [IBM] salesmen are not getting any commission; they're just being told to recommend [System W]. In two months it'll be as if [the deal] never existed."

Greenfield pointed to the fact that IBM will continue to offer IFPS on its Information Network remote computing service as a mitigating factor. "The System W agreement doesn't make System W a product of IBM," he said. "It also doesn't preclude IBM salesmen from recommending IFPS."

Bergstrom agreed. "The question is whether IBM is going to hold together on this. I'm not sure if this is an exclusive agreement, and there may be others in the works," he said. "We've seen IBM salesmen recommend IFPS before."

The IBM spokeswoman said that the Comshare agreement was concluded with IBM's National Accounts Division (NAD), which is separate from IBM Information Services, an independent business unit that includes the Information Network. She said the NAD agreement was different from the Information Network's agreement with Execucom.

The price of System W ranges from $75,000 to $110,000. Micro W licenses for $1,000 for each copy, with quantity discounts available. Comshare is located at 3001 S. State St., Ann Arbor, Mich. 48104.



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Franklin settles copyright dispute with Apple

Agrees to pay $2.5 million, use own operating system

By David Myers
CW New York Bureau

NEW YORK — Franklin Computer Corp. last week gave up its highly publicized legal battle with Apple Computer, Inc. over the copyrightability of operating systems and of computer programs embedded in read-only memory (ROM).

At a hastily called news conference here on Wednesday, Franklin President Avram Miller announced that his company, a maker of Apple-compatible microcomputers, had agreed to pay Apple $2.5 million to settle the dispute. In addition, Franklin agreed to accept the validity of Apple's copyright claim on its operating system software and to stop copying the Apple programs.

In accepting the settlement, Miller said Franklin was accepting "as law" the September decision of the Third Circuit Court of Appeals, which ruled that copyright protection extends to operating systems as well as to applications programs [CW, Sept. 12].

The appeals court decision had overturned an earlier lower court ruling that denied an injunction against sales of the Franklin ACE series of microcomputers.

Question remains unresolved

The settlement also means that Franklin has dropped its plans to appeal the case to the U.S. Supreme Court. As a result, the question of the copyrightability of ROM-based programs remains unresolved, according to legal experts contacted last week by *Computerworld*.

"One of the reasons we wanted to settle was that we felt we were in a lose-lose situation," Miller said. "The longer we pressed our case, the more we felt we would hurt not only ourselves, but Apple and the software industry."

In Cupertino, Calif., an Apple spokeswoman hailed the out-of-court settlement as "significant not only for us, but for other computer and software manufacturers who need [copyright] protection to design new technologies and products."

Not 'expressions of idea'

Franklin had originally argued that operating systems could not be copyrighted since they are not the "expressions of an idea" required by copyright law.

The company contended that the silicon chips holding the operating programs are useful devices rather than "expressions" and thus cannot be "understood."

As part of the settlement, Franklin has been given until April 1 to stop manufacturing computers with software copied from Apple. After then, the Cherry Hill, N.J.-based vendor can sell Apple-compatible boxes only with an operating system of its own devising.

Miller said Franklin had decided to give up its case against Apple, even though it had asked the U.S. Supreme Court to hear arguments from both sides, because the company is close to bringing its own operating system to market. "If we felt we couldn't do that, we wouldn't have settled," he said.

Miller was vague, however, when asked when the market could expect the Franklin operating system. And he would disclose neither the cost nor the time spent to develop the new operating system code.

Asked how the Apple and Franklin operating systems would differ, he replied that Franklin's operating system "implements the same functions [as Apple's] in a different code." He declined to elaborate.

In Cupertino, the Apple spokeswoman said her company had not yet studied the Franklin operating software, but noted that the out-of-court settlement provides for arbitration of future copyright disputes between the two firms.

Neither she nor Miller, however, would say anything more about the arbitration process.

'We'll still be competing'

Asked if he considered the settlement a defeat, Miller replied, "I'll trade a legal victory for a victory in the market. We'll still be competing with Apple — just not in court."

Miller said the $2.5 million his company agreed to pay Apple is "something I'd rather not spend, but it's not a financial drain" on the firm. A source close to the micro vendor said Franklin had set aside as much as $5 million of its recent $11 million private fund-raising issue to cover the cost of any settlement with Apple.

Asked if Franklin had thus gotten off cheaply, Apple's spokeswoman declined to comment.

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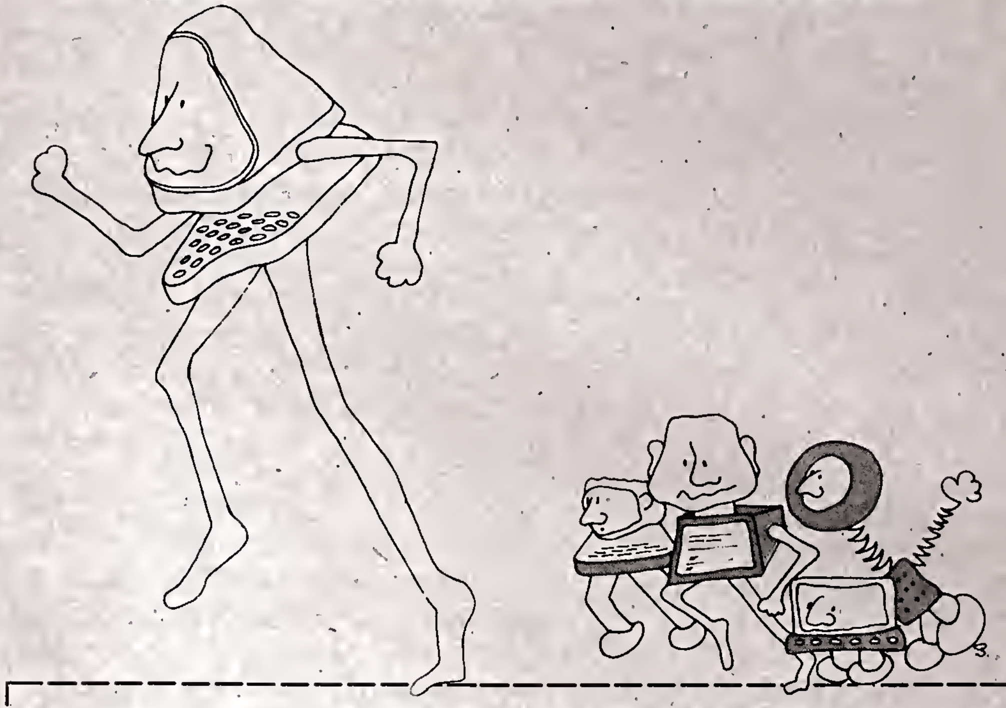

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Portables on planes under probe

By Lynn Haber
CW Staff

WASHINGTON, D.C. — A federal advisory committee for the airline industry has begun studying whether high-technology devices such as portable computers brought on board an airplane interfere with the aircraft's electronic equipment.

The committee on "Potential Interference to Aircraft Electronics Equipment From Devices Carried Aboard" is a result of the first meeting of the Radio Technical Commission for Aeronautics (RTCA), held this past November. RTCA, a nonprofit organization sponsored by government and industry, had been approached by Eastern Airlines to look into possible interference problems.

"In recognition of the fact that the airplanes themselves are getting more complex and heavily computerized, and these personal computers do represent a significant advance in state-of-the-art technology, we thought it was best to find out if there is a need for caution regarding their use in common operating areas on board the aircraft," explained Jim Ashlock, spokesman for Eastern Airlines. Eastern has banned the use of personal computers on board aircraft.

The RTCA plans first to look into how the passenger-operated devices affect the aircraft antennas. That testing will be undertaken by members of the airframe industry, according to Rod Jago, technical staff officer for RTCA and secretary of the special committee.

"Boeing [Co.] has volunteered, and we're asking McDonnell Douglas [Corp.] and Lockheed [Aircraft Corp.] to do some testing. We've also asked some airlines to do testing. The Federal Aviation Administration [FAA] will be asked to do some testing on their 727," Jago said.

The second phase of testing will examine what type of radio frequency spurious emissions escapes from a variety of devices. (Interference caused by escaping radio frequency energy can be seen on a home television screen in a neighborhood where someone is operating shortwave radio equipment, for example.) Some computer industry representatives who attended the RTCA meeting, including Tandy Corp., Apple Computer, Inc. and Hewlett-Packard Co., volunteered to test computer equipment, according to Jago.

"One of the things that will hopefully come out of this study is a standardized type of procedure among airlines which will help not only the people who want to use these types of devices, but also the airlines themselves," Jago said. "We'll also be able to develop some kind of listing of acceptable and not acceptable devices when used under certain situations."

The committee made no recommendation to ban the use of carry-on personal computers aboard aircraft, although an interim recommendation to ban the use of portable computers during takeoff and landing was suggested.

"The committee felt that a ban would be premature because at the present time we really don't have any documented, first-hand evidence that there is a problem," Jago said.

The FAA does ban the use of transistor FM radios on planes, because the band frequency on some FM devices is close to the aircraft's communications band.

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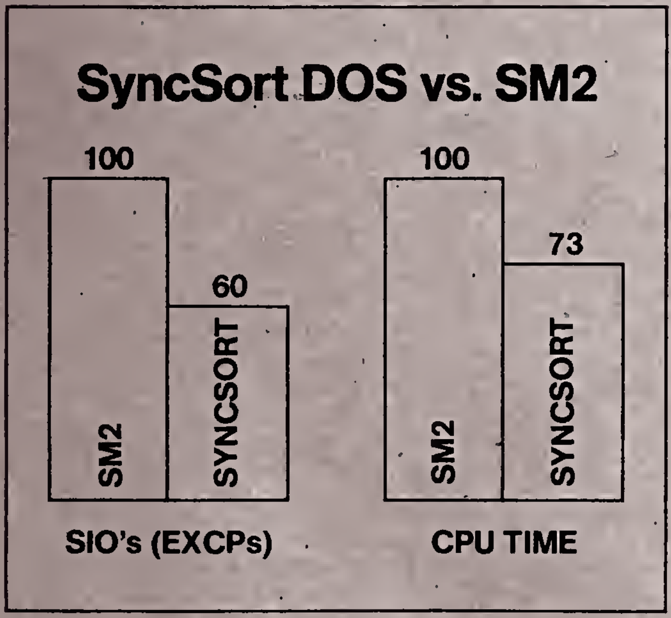

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Plan would widen FBI electronic surveillance

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — A proposal to expand the Federal Bureau of Investigation's electronic surveillance of noncriminals has fueled congressional efforts to develop legislation regulating the bureau's computerized criminal records system.

The proposal, now under consideration by the National Crime Information Center (NCIC) policy advisory panel, would expand the FBI-operated interstate records exchange network to include separate files on "associates" of certain types of criminals. These include drug traffickers, terrorists, foreign espionage agents and members of organized crime.

The idea came from the policy board's planning and evaluation committee at the board's meeting in Denver last October. According to Board Chairman Fred H. Wynbrandt, the four proposed new files were among several suggested by the subcommittee.

Wynbrandt said the ideas were put forward in "a brainstorming session" on ways to make the NCIC more helpful to law enforcement officers. He said another proposal, to include information on persons known to be associated with wanted persons, was "rejected out of hand" by the board as "beyond where the policy board wanted to go, way beyond."

Wynbrandt, who is assistant director of the Criminal Information and Identification Branch within the California Attorney General's Division of Law Enforcement, said the board is sensitive to fears the NCIC might become too involved in intelligence-gathering on noncriminals. "We're concerned about privacy, security and individual freedoms," he asserted.

Nevertheless, the proposal has alarmed Capitol Hill critics of NCIC operations, who last year unsuccessfully opposed an FBI decision to turn what was originally a record system into a national surveillance system. Last April the Secret Service included on the NCIC system a file to monitor the activities of some 125 persons that the service fears may threaten the president and other protected persons.

FBI authority questioned

At the time, Rep. Don Edwards (D-Calif.), chairman of the House Judiciary Subcommittee on Civil and Constitutional Rights, which has jurisdiction over the NCIC, insisted the new file was outside existing FBI statutory authority and required new legislation. The FBI disagreed and got the support of the full Judiciary Committee, which was convinced by arguments the file was necessary to protect the president.

Since then, Edwards' subcommittee and its Senate counterpart, the Judiciary Subcommittee on Patents, Copyrights and Trademarks, have been exploring the possibility of legislating guidelines for the system's record quality and for access to the system by non-criminal-justice persons.

Congress' Office of Technology Assessment reported last year that a high level of record errors reduces the effectiveness of the NCIC. Access is also a long-standing problem, because in some states anyone can obtain NCIC records, meaning sensitive and possibly inaccurate data can be disseminated beyond the control of law enforcement authorities.

The Edwards' subcommittee plans to hold hearings on the new associate's file proposal in late February or early March. According to a subcommittee staff attorney, the proposal concerns Edwards, who attended the October policy board meeting, because the NCIC is authorized to collect, maintain and exchange only criminal data "that is a matter of public record somewhere."

Investigatory and intelligence data, however, while legitimately maintained by individual law enforcement units, should not be available on a police information system, the attorney said. He explained, "It could result in a national surveillance system for exchange of information that is derogatory and that has not been tested in court and will in fact be used against a person."

Steven J. Metalitz, staff director of the Senate subcommittee, said the panel is aware of the proposal for the associate's file and will take a closer look at it if it progresses beyond the discussion phase. He said the subcommittee "would be skeptical about [the proposal] if there is a real danger of turning the system into one that is more intelligence-oriented."

Surveillance uses of the NCIC, such as those proposed in October and the existing Secret Service file, are "inconsistent with other [record exchange] uses of the NCIC," he said.

Besides congressional opposition to the proposed files, there remains considerable work that must be completed before they can be implemented. Regional groups of the policy board, which represents NCIC users, are now considering the new files. If approved on this level, the proposal must still receive final board and FBI endorsement.

NYC computerized tax program collects $40 million from evaders

NEW YORK — A computerized tax program designed to catch up with individuals and businesses which have evaded city tax payments has resulted in the collection of millions of dollars here.

Operating since July 1981, the Taxpayer Automated Compliance System (Tacs), run by New York City's Tax Division, has aided in the collection of more than $40 million from over 55,000 persons and firms.

By using a system that matches various types of files, the city has been able to detect evaders of commercial rent tax, unpaid business income tax and delinquent individual taxpayers. "We take existing city or state files and match them against our tax files," explained Umberto Dindo, director of Tacs.

The initial tax project, aimed at evaders of commercial rent tax, brought in approximately $20 million alone from over 100,000 businesses.

The City Tax Division employs 30 people to run the program and mails an average of half a million letters per year, according to Dindo. "The initial match — the big one where we also had to create the files, the online system and so on — was costing about 10 cents on the dollar," he said. "But in the meantime, we've run the program over and over again, and we're down to an average of four to five cents on the dollar, which includes software, computer time, postage and clerical time."

A spin-off of Tacs is to detect and follow up delinquent taxpayers, including those who have never filed returns. "Everything from the initial questionnaire all the way down to the warrant is being produced by that program," Dindo said.

The Tacs program and all the associated software were developed by the data processing division for the tax department. The tax department uses two IPL Systems, Inc. 4446 computers with 4M bytes of memory.

"We are constantly developing new programs for the match because we have not done every match we would like to do," Dindo said.

CORRECTIONS

"Venture Unveils Service Merging Payroll, Personnel" [CW, Dec. 12] incorrectly stated the name of one of the vendors involved in the agreement. The service is a joint venture between Chemical Bank and Information Science, Inc.

The correct price of "Computer Access Security Report" [CW, Dec. 12] is $1,495. It is available from Federal Engineering, P.O. Box 2486, Gaithersburg, Md. 20879.

" 'Valu Lib' Update Released for IBM 4300s, Series/36" [CW, Dec. 19] incorrectly identified the host computers required by Valu Lib. The product runs on IBM 4300 series and 30 series mainframes under IBM's MVS and VS1 operating systems.

"Maestro" is the correct spelling of the product from Softlab Systems mentioned in the letter to the editor written by Robert Gregory [CW, Dec. 26/Jan. 2].

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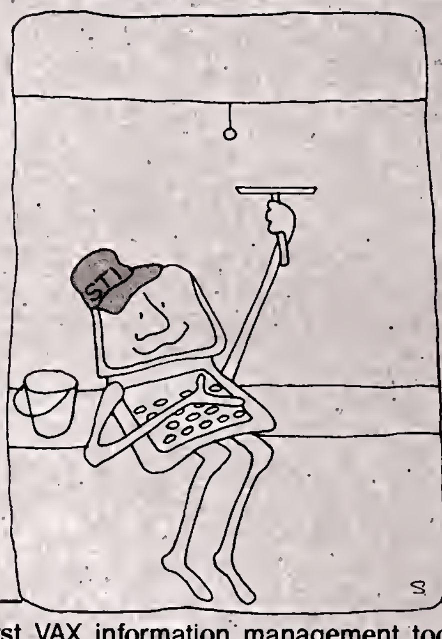

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DEC pays $3.2 million to settle GSA claims

By Bill Laberis
CW Staff

Digital Equipment Corp. last week said it has paid the U.S. government $3.2 million to settle claims lodged against it by the Government Services Administration (GSA).

The claims, in which the Justice Department alleged DEC had defrauded the government in the sale of $70 million worth of computers in the late 1970s, were settled without DEC's admitting or the government's proving any wrongdoing on the part of the Maynard, Mass., company. However, a government spokesman said the settlement does not diminish the allegations of fraud made by the Justice Department, even though the department will not pursue court action.

"It was the government's assertion that the mispricing of data, which initiated our investigation, was the result of fraud," said Robert Ashbaugh, assistant director in the commercial litigation branch of the Justice Department. "At the same time, it could very well have been simply the kind of dispute that would involve a breach of contract.

"We really gave up our right to prove or to say, with any degree of specificity, that [DEC] was guilty of fraud when we settled the case," Ashbaugh continued.

A DEC spokesman strongly denied the allegation of fraud, saying instead that DEC complied fully with its contractual obligations and requirements in its dealings with the GSA and other government agencies. "Perhaps more than anything, this matter points up the complexity and difficulty in dealing with the government," the spokesman said.

According to the Justice Department's Ashbaugh, the $70 million deal with DEC was part of a so-called multiple award contract, wherein the GSA certifies several vendors as appropriate and the various federal agencies can then choose among the certified vendors to fill equipment needs. Inherent in this procedure is the understanding that the government is entitled to most-favored customer status, guaranteeing it the best (lowest) price, Ashbaugh said. The GSA certifies that the government is getting the best price by scrutinizing purchase orders that the certified vendors have filled for other commercial customers.

It was the government's contention that DEC did not furnish GSA all the paperwork it should have and, thus, submitted a price schedule that was higher than it should have been — several million dollars higher.

The DEC spokesman said that the government was given all the documentation it had requested. But he said further that the nature of government procurement makes it virtually impossible to make the absolute best deal with government agencies.

For example, he said, the government demands that the shipping and transit insurance fees be paid for by the vendor. And government agencies can take up to six months to evaluate a machine before paying any part of the cost.

"Under those conditions, it's hard to see how the government is going to be entitled to the best discount available," the DEC spokesman said.

Both DEC and Ashbaugh called the $3.2 million settlement fair. The government would not say whether the payment included any penalty, characterizing it only as a lump sum payment.

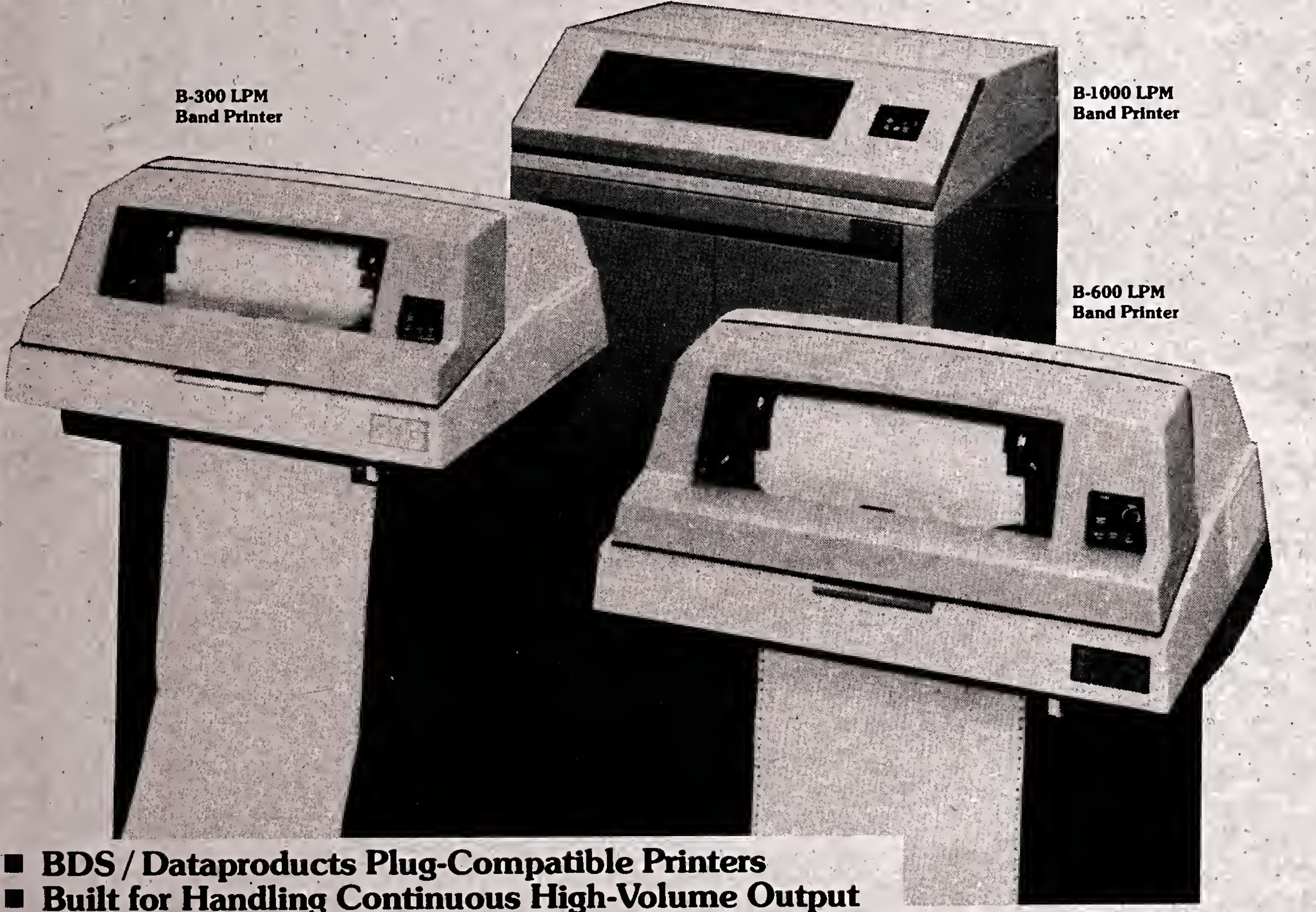
Hitachi execs fined $10,000

SAN FRANCISCO — A federal judge here has slapped a $10,000 fine on two Japanese computer company executives who recently pleaded guilty to charges of conspiring to transport stolen IBM systems technology from the U.S. to Japan.

U.S. District Court Judge Spencer Williams fined Hitachi Ltd. executives Kisaburo Nakasawa and Takehiro Inoue for their role in a widely publicized trade-secrets theft case involving IBM and two of its Japanese competitors. The two, both 45, are employed at Hitachi's Kanagawa Works hardware development facility in Japan and hold the titles of general manager and department manager, respectively.

Nakasawa and Inoue were among nine Hitachi employees indicted during the summer of 1982 for participating in a Japanese scheme to steal numerous IBM trade secrets, including MVS/SP Version 2 source code and hardware designs for the 3081. To obtain the highly confidential IBM property — which was later recovered after the plot was exposed — Hitachi paid more than $600,000 to Federal Bureau of Investigation agents posing as electronics black marketeers.

For months after news of the arrests broke, the Hitachi defendants refused to answer summonses, but Nakasawa and Inoue recently entered their pleas in federal court.



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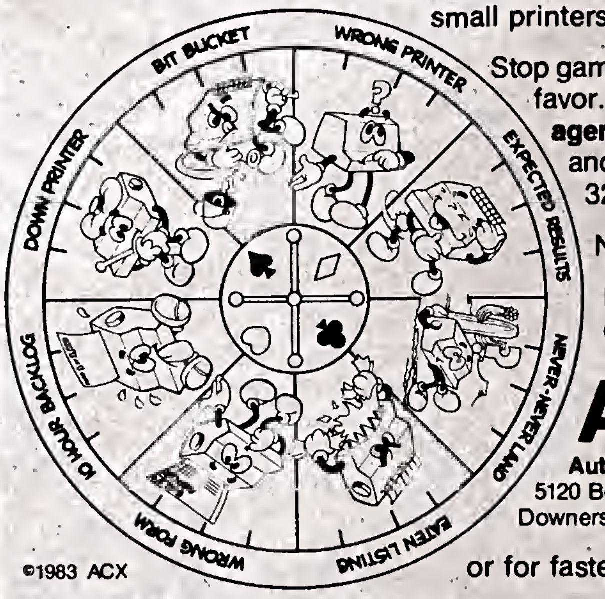

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Software aids crackdown on trade in stolen goods

LOUISVILLE, Ky. — Armed with a computer program that they developed themselves, a veteran police detective and a data processing department joined forces in a crackdown on thieves who sell and pawnshops that buy stolen goods.

The program that runs on Jefferson County Police Department's IBM Series/1 minicomputer lets Detective Bob Roby review in minutes data that once took hours, even days. The program has helped him recover $55,000 worth of stolen property, clear 71 burglaries and make 58 arrests between February and December of '83.

On the pawnshop detail for the 600-member police force that covers the area surrounding Louisville, Roby hands out 3- by 5-in. cards asking pawnbrokers, jewelers and gold dealers to record the names, addresses, thumbprints and other data about people who sell them items. But last January, with the cards building up at the rate of several hundred per week, Roby sought help from Sgt. Phil Miller, who handles data processing and telecommunications for the department.

"I figured that if I had a computer, I could serialize things and be able to go back and check out whether an individual was selling a lot of one type of item, say, shotguns. Then we could check him out. I not only needed to know who was selling them, but needed the serial numbers, too.

"A lot of people don't keep serial numbers, so I needed a way to help them identify their stolen property," Roby said.

Days to develop

Miller used a Series/1 utility known as Prompt, produced by Mid/American Control Corp. of Shelbyville, Ky., to write a program for Roby's project. "It wasn't that hard to do," Miller recalled. "It only took a couple of days to develop and a week to test it."

Now Miller and his civilian assistant, Janice Carter, transfer Roby's data from cards onto diskettes each week. The minicomputer produces a printout, now five inches thick, cross-referencing the data by item, seller's name and pawnshop.

Roby hopes to have his own terminal or IBM Personal Computer soon to input directly into and access the Series/1. "It's been more successful than we ever dreamed.. We haven't even begun to scratch the surface with the computer. Other detectives are always asking for my information, and I know we'll be able to do still more once we get our own computer and get it loaded," Roby maintained.

Primary job

Meanwhile, Miller reported that the pawnshop program is only one relatively minor task for the Series/1. The computer's primary job is keeping crime, incident and activities statistics for the department and training records. A typical use is the study of selective enforcement, where the computer is used to show what impact increased police presence has in a particular neighborhood.

One program, now being tested, that Miller developed using Prompt will catalog sex crimes, sex offenders and violent criminals so detectives can identify potential suspects by inputting individual characteristics of a crime.

The police department, which utilized general county data processing services until 1981, paid about $65,000 for its computer and software. It now spends $68,000 per year for data processing, compared to $320,000 annually when it was part of the county network.

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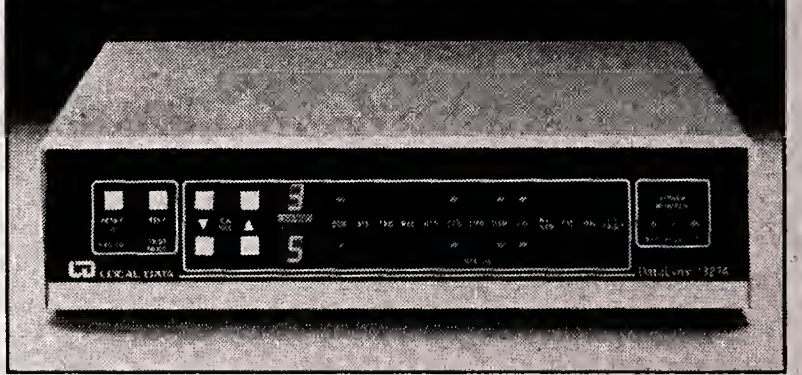

Array processors gaining appeal

PRODUCT SPOTLIGHT

By Tom Henkel
CW Staff

Serious scientific processing was once a task reserved for big, wealthy users of very large mainframes — oil exploration firms, defense organizations and weather-tracking institutions, for example.

Led by the booming medical imaging field, however, more users of superminicomputers and low-end mainframes have turned to stand-alone array processors to help them process computer-intensive applications like simulation, signal processing and computer-aided design.

The concept of array processing is not new. Scientists have known for some time that certain computer applications, typically those involving large blocks of mathematical data, can be processed much faster than one calculation at a time can be processed. That is basically what an array processor does: breaks up a problem, or series of problems, and puts mathematical operations into groups, or arrays. With data in that format, a processor is capable of performing multiple additions, subtractions or divisions at one time.

Array processors themselves are not new either, at least not by computer industry standards. Most of the major players in the stand-alone array processor market have been around for at least five years.

Array processors are architecturally similar to supercomputers, the multimillion-dollar processors that typically handle mammoth programs like nuclear research and meteorological forecasting. The major differences between supercomputers and array processors are cost and speed. Supercomputers currently can execute upward of 100 million floating-point operations per second (Mflops). Supercomputers recently announced by the Japanese firm Nippon Electric Co. (NEC), for example, boast a throughput of 300 Mflops; Control Data Corp. claims its top-of-the-line Cyber 205 can execute some 200 Mflops.

Array processors, in contrast, are much slower. Currently, the most powerful array processors, such as the top-of-the-line models from Star Technologies, Inc. and Floating Point Systems, Inc., offer a maximum throughput of some 100 Mflops. Most other array processors operate considerably slower, about 5 to 50 Mflops, according to Jeffry Canin, a technical analyst with the San Francisco investment banking firm of Woodman, Kirkpatrick & Gilbreath.

But if array processors are considerably slower than supercomputers, they are also considerably less expensive. Supercomputers typically cost upward of $7 million. Array processors tend to cost less than $300,000, with some units costing as little as $5,000.

With the right application, array processors can improve the calculation of a general-purpose minicomputer by a ratio of 50:1 or 1,000:1, claimed Business Development Group, Inc., a market research firm in Stanford, Calif., in a recently released report on the array processor market.

But array processors are not for everyone. Like supercomputer users, the array processing community is a very sophisticated lot. Applications tend to be very specialized, and not much packaged software is available for array processors, Bob Hausman, vice-president of development at Star Technologies, point-

See **ARRAY** page 12

STAND-ALONE ARRAY PROCESSORS FOR MEDIUM-LARGE SYSTEMS

Vendor[1]	Model	Maximum Address Spike (Word Size)	Compatible Processors	Price[2]
Analogic, Inc. Audubon Road Wakefield, Mass. 01880	AP500	32 Bit	Digital Equipment Corp. PDP-11	$25,000
Computer Design and Applications, Inc. 377 Elliot St. Newton, Mass. 02164	MSP	24-Bit Floating Point	DEC PDP-11 and LSI-11	$12,900 - $18,900
Computer Signal Processing, Inc. 40 Linnell Circle Billerica, Mass. 01821	Map 200, Map 300	32-Bit Floating Point	DEC PDP-11; Data General Corp. Nova, Eclipse; Gould, Inc. SEL Systems; Raytheon RDS 500, 704; Prime Computer, Inc. 400, 500; Hewlett-Packard Co. HP 2100; Harris Corp. Processors	$22,350 - $36,000
	Mini Map	32-Bit Floating Point	DEC PDP-11	$14,700
Floating Point Systems, Inc. P.O. Box 23489 Portland, Ore. 97223	AP 120B AP 190L FPS-1000 FPS-5000	38-Bit Floating Point 38-Bit Floating Point 38-Bit Floating Point 38-Bit Floating Point	DEC PDP-11; DG Nova, Eclipse; Gould SEL; Raytheon RDS; Prime 400, 500; HP 2100; Harris Minicomputers; IBM Mainframes; Sperry Corp. Mainframes; Control Data Corp. 6000	$18,500 - $29,050
Marinco, Inc. 11760 Sorrento Valley Road San Diego, Calif. 92121	3000	24-Bit Floating Point	Intel Corp. Multibus, DEC Q-Bus	$4,250
Numeric, Inc. 320 Needham St. Newton, Mass. 02161	432	32-Bit Floating Point	Stand-Alone	$75,000
Signal Processing Systems, Inc. 223 Crescent St. Waltham, Mass. 02154	SPS	16-Bit Fixed Point or Floating Point	DEC PDP-11; DG Nova, Eclipse; Modcomp Minicomputers	$29,000 - $50,000
Sky Computers, Inc. Foot of John St. Lowell, Mass. 01852	Skymnk	32 Bit	DEC Q-Bus, Intel Multibus	$6,000
Star Technologies, Inc. 1200 Benjamin Franklin Plaza Portland, Ore. 97258	ST-100	32 Bit	IBM Mainframes DEC VAX 11/780	$250,000
Stein Associates, Inc. 280 Bear Hill Road Waltham, Mass. 02154	AR/10	16-Bit Fixed Point or Block Floating Point	DEC PDP-11; DG Nova, Eclipse	$60,000 - $150,000

[1] The Top 10 Array Processor Vendors in Terms of Sales
[2] For a Basic System Configuration

Source: Business Development Group, Inc.

Array processors found prevalent in CAT scanning

STANFORD, Calif. — Who's using array processors? A market research firm here believes it has identified the most likely markets for array processor use.

Perhaps the hottest market today for array processors is in medical imaging, according to Business Development Group, Inc., a market research firm here, which recently released a report titled "Array Processor Market Report."

The report noted that the array processor market has jumped from $10 million in 1977 to about $130 million in 1982. Hospitals, research foundations and laboratories use array processors for computer-aided tomography, more familiarly known as CAT scanning. This application uses the array processor to analyze X-ray data to generate pictures of body tissue.

Graphics artists also use array processors, as do textile designers and photograph printers, who employ array processors to manipulate patterns, photos or text to create a master plate for printing.

Oil exploration and service companies use array processors for seismic exploration, well logging and electromagnetic surveys. Array processors are used to evaluate mechanical or acoustic signals sent into land masses or the sea. The application is similar to a CAT scan, but earth masses instead of tissue are being evaluated, the report noted.

Linear programming

Businessmen and production managers, specifically those involved with mining, timber harvesting and transportation, can make use of array processors for linear programming — manipulating complicated arrays of numbers to optimize yields. The array processor can evaluate variables including time, capacity and market prices, the report noted.

Array processors are used for applied research at various universities, foundations and government agencies. Since much research involves sophisticated image- or signal-processing applications, basic research is a catchall category for array processor use, the report said.

The military is also a big user of array processors for such applications as pattern recognition, cartography, robot-controlled ordnance and navigation systems. Array processors can also be used to evaluate satellite data and radar images.

Many organizations, including the government, banks, operators of private data links, point-of-sale networks and oil companies, would like to use voice processing. Array processors can help to secure data transmission and to encrypt and identify voices by manipulating signals, the report said.

In addition, array processors can be used for complex computer-aided design (CAD) applications, such as circuit design. They can also be used for process-control applications such as monitoring many remote sensors

See **SCANNING** page 12

#1

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ARRAY

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ed out. Many users prefer to develop their own software for array processors, he added.

Canin, however, said that while the amount of packaged software for array processors is miniscule when compared with, for example, packaged software for the IBM mainframe market or the microcomputer market, there are software packages available for popular array processors which offer a basic set of algorithms. Users can customize those algorithms to suit specific applications. Among these packages are Nastran, a structural analysis package, and Spice, a standard circuit design package. Both are produced by Macneal-Schwendler Corp.

Like the applications for supercomputers, most applications for array processors are developed in Fortran. Because Fortran is somewhat more difficult than the so-called "user-friendly" languages available for file-oriented processors, not everyone is capable of using an array processor.

But according to Star Technologies' Hausman, an entire corporation does not require access to an array processor. In fact, only some applications employ a sufficient level of computations to run efficiently on an array processor. Some applications can actually be executed faster on a standard commercial processor.

Array processor users typically access the unit through a front-end processor, such as a supermini or mainframe. But Hausman noted some array processors can accommodate a microcomputer at the front end.

Some array processors can be configured with their own memory, while others share memory with the front-end processor. Sharing memory with the front-end processor boosts the speed of the array processor if it must frequently access information from the front-end processor, Canin said.

Since not all applications are suited for array processing, there must be some way to determine which programs should be sent to the array processor and which should remain in a file-oriented system. For some applications, the decision is easy, especially for the sophisticated users that typically use array processors. But for those cases in which the user is unsure whether the application will efficiently support array processing, Hausman said, there are precompilers, such as the Vast produced by Pacific Sierra, Inc., which help evaluate applications before submission to an array processor.

What makes a firm decide to buy an array processor? According to Lester Gerhardt, a computer scientist at Rensselaer Polytechnic Institute in Troy, N.Y., time is often the major criterion. Some applications are so complex and so computer-intensive that they take an extremely long time to process on a conventional mainframe or superminicomputer. If a firm has enough of those applications, buying an array processor is a logical choice. An array processor is often less expensive than adding the extra file-oriented processors to speed up processing significantly.

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and making production decisions and for nondestructive testing applications, the report noted.

What does the future hold for the array processor market? According to Business Development Group, decreasing costs for both minicomputers and array processors will make more minicomputer users willing to buy array processors.

In addition, applications such as CAD and computer simulation are becoming more popular. Since both applications require a high degree of computing power, more users of minis and low-end mainframes will find themselves forced into buying a stand-alone array processor to go along with their current systems.

The report costs $1,500 and is available from Business Development Group through P.O. Box 3044, Stanford, Calif. 94305.

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It was DP business as usual after Boston hotel fire

By James Connolly
CW Staff

BOSTON — Although a smoky electrical fire injured 65 people, caused $500,000 in damages and cost millions of dollars in lost revenues, the data processing department at the Westin Hotel here barely missed a step.

The Jan. 2 fire disrupted the hotel's main and emergency power supplies and closed the building for several days at an estimated loss of $1 million a day in revenues. But less than 24 hours after the mid-day fire drove 120 guests and hundreds of employees to the street, the data crucial to operating the "fully automated" luxury hotel — safely stored on diskettes — was being processed to meet payroll and end-of-month and end-of-year accounting deadlines.

Amid adversity, it was business as usual in the computer room. "We are very fortunate," said Systems Manager Dennis Nixon. "When the power went off, everything crashed. But I turned a key in a box on the wall for the backup power supply, and we were up again in no time at all.

"We did a complete back-off, and I took all of the software out in a box and brought it home with me for safekeeping for the night."

Nixon noted that his systems assisted in evacuating the hotel; rescuers were armed with printouts, produced every four hours, indicating the names of guests and the occupancy of each of 700 rooms.

"A lot of people are intimidated by computers. I think that after this experience, they won't be anymore, at least not in this hotel," Nixon concluded.

Backup power at work

As electrical crews worked last week to restore power, front desk clerks shivered without heat in a lobby lit by emergency lights and an oil hurricane lamp, helping guests relocate and recover luggage the day after the fire. But five floors above in the administrative offices, Nixon's dedicated backup supply provided power for IBM and NCR Corp. systems and four table lamps. In addition, accounting department personnel moved in to use Nixon's power for calculators to complete their monthly and annual reports.

Nixon said he was not using several systems, partially because he was unsure how much power was available. But, he added, his main reason for idling much of the equipment was that there were no guests and few employees to service.

The basement fire was caused by a short circuit in a switching room, according to fire officials. The blaze burned cables for the regular and emergency power supplies. But the emergency supply for the computer center was independent of both central systems.

CW Photo by J. Connolly

Workers shared only power source available after Westin fire.

The 37-story hotel, which opened last June, uses two IBM System/36s, two IBM Series/1s and two NCR 2160 minicomputers. The systems not only handle administrative tasks such as payroll and accounting, but provide on-line service to the hotel restaurants, housekeeping department, front desk, reservations office and other departments.

There are more than 75 terminals located throughout the hotel, but only those in the computer center were operating during the power outage.

Nixon said that the return to full operations would only mean running daily audits for the various departments for the days they were closed and manually entering payroll information for maintenance workers and other employees who worked during the shutdown. "Actually, things worked out pretty well for us, because we can concentrate on the payroll and accounting without having the rest of the operations to worry about. We're very happy that we can pay the employees. That's a priority for the company," Nixon reported.

"We could have worked on the day of the fire if they had let us back in the building. I brought the diskettes with me, just in case we couldn't get back in for days. Then I could have gone to IBM to work, but that would have taken a full day just to config-

See **FIRE** page 14

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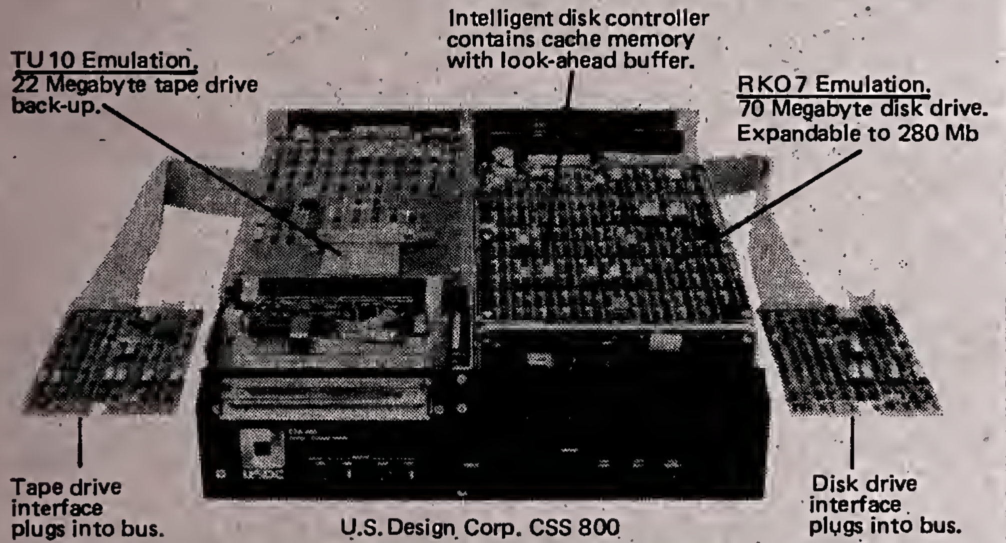
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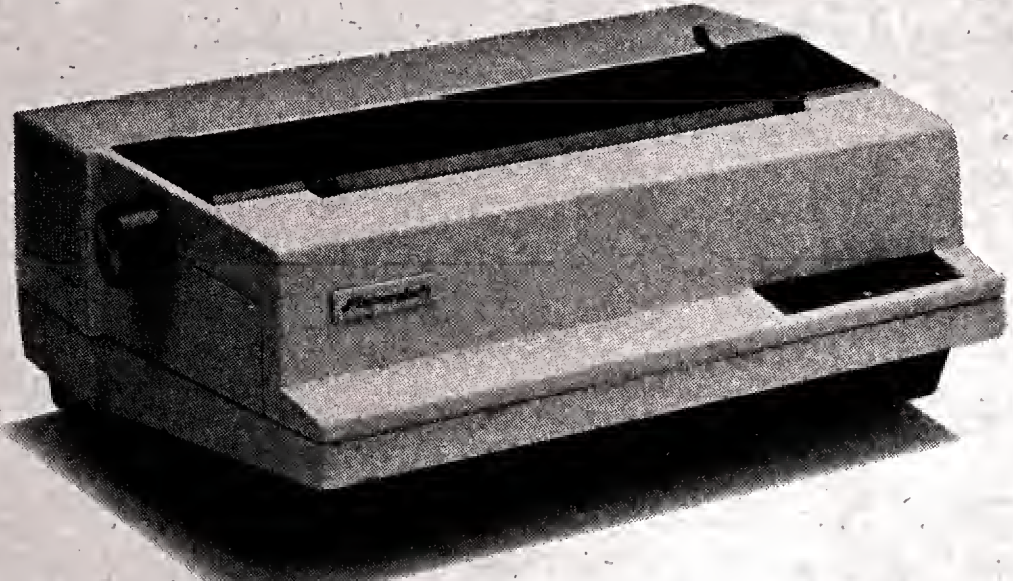

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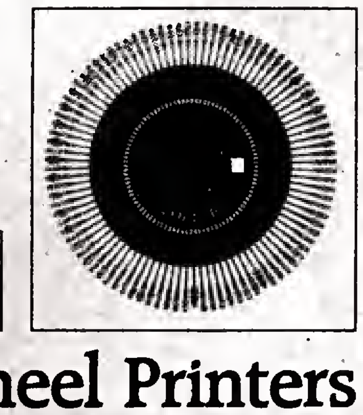

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FIRE

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ure the system to run our software," he added.

While the hotel was closed, arriving guests, including 400 members of the Northeastern Retail Lumbermen's Association in Boston for an annual convention, were relocated to other hotels.

The New York Westin collected from United Airlines' Apollo reservation system the names of scheduled arrivals and telephoned them to Boston so arrangements could be made for those people.

The hotel rented office space to run a secretarial pool during the power outage.

CW Photo by J. Connolly

Boston's Westin Hotel

Stories on networks sought

Computerworld is looking for a few good stories on data communications networks. A Feb. 27 Special Report on the subject is now in the making, and contributions are welcome until Jan. 16.

Contributed stories can take two forms: tutorials that are not product-specific and cover a trend or direction in data communications networks; or case studies of specific users who have solved specific business problems with a certain type of data communications network.

These articles should be between four and six double-spaced, typewritten pages in length. Authors are encouraged to include any camera-ready art or black-and-white photographs.

Authors should include with all submissions a very brief biography (name, title, company, city, state) and a telephone number at which they can be reached.

Articles should be sent to Jim Bartimo, Senior Editor/Communications, *Computerworld*, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Data base built to help Salvadorans gain asylum

By Peter Bartolik
CW Staff

WASHINGTON, D.C. — Residents of war-torn El Salvador who seek political asylum in the U.S. and who need the high level of proof it requires can now turn to a computerized data base for assistance.

The data base, jointly compiled by two private, nonprofit organizations here, helps Salvadorans obtain documented evidence that their forced return to El Salvador would subject them to human rights violations and persecution there.

The data base was recently established by the Center for National Security Studies and the Political Asylum Project of the American Civil Liberties Union (ACLU) Fund of the National Capital Area.

The Documentation Center, ACLU Fund spokeswoman Maria Boza said, has three goals: to provide data needed by attorneys representing Salvadorans who are seeking political asylum in the U.S.; to assist those engaged in the debate over legislative initiatives to provide Salvadorans with temporary legal protection against deportation; and to make documentation of human rights abuses in El Salvador publicly available.

"The level of proof demanded of asylum applicants by the Immigration and Naturalization Service, the Immigration Courts and the State Department has always been high," Boza said. "Asylum applicants have been required to present specific evidence corroborating that they have a particularized and individualized fear of persecution if returned to their country."

During the first three months of 1983, according to Boza, only 31 requests for asylum were granted to Salvadorans, while 1,426 requests were denied.

The ACLU Fund began its Political Asylum Project last April. Paper indexing of the materials did not work out too well, Boza said, so in July the Project and Center for National Strategic Studies joined up to compile the data base on the center's Televideo Systems, Inc. TS800 microcomputer, using Ashton Tate's Dbase II data base management system.

Two principal files have been compiled. One contains a list of more than 18,000 Salvadorans who have either been killed or imprisoned in El Salvador.

The second file is an index of more than 1,000 documents, such as government reports and cables, reports in periodicals and reports by the ACLU Americas Watch.

The Political Asylum Project is located at 122 Maryland Ave. N.E., Washington, D.C. 20002.

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FCC rules on marketing satellites, network interfaces

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — AT&T must market receive-only satellite earth stations through its deregulated, separate subsidiary, the Federal Communications Commission ruled last month. The commission also decided that the newly divested Bell operating companies must similarly market wideband channel interfaces through separate subsidiaries.

Both actions are related to an escalating battle between the carriers and their competitors, which seems likely to affect the quality and diversity of future "smart network" services. The key issue is who will control and supply the interface between a user's terminal and the growing number of high bit-rate channels being offered by the carriers.

These interfaces are usually referred to as channel service units (CSU) or network channel terminating equipment (NCTE).

The stakes in this battle are high for users as well as vendors, since the channels are the forerunners of the integrated services digital network (ISDN) which, within the next five to 10 years, is expected to carry virtually all of the digitally encoded information generated by U.S. business communications users.

Under the FCC's Second Computer Inquiry decision, AT&T is required to market terminal equipment (customer premises equipment or CPE) through a deregulated separate subsidiary.

But the company can apply for a waiver of this rule, as it did recently in the case of receive-only earth stations.

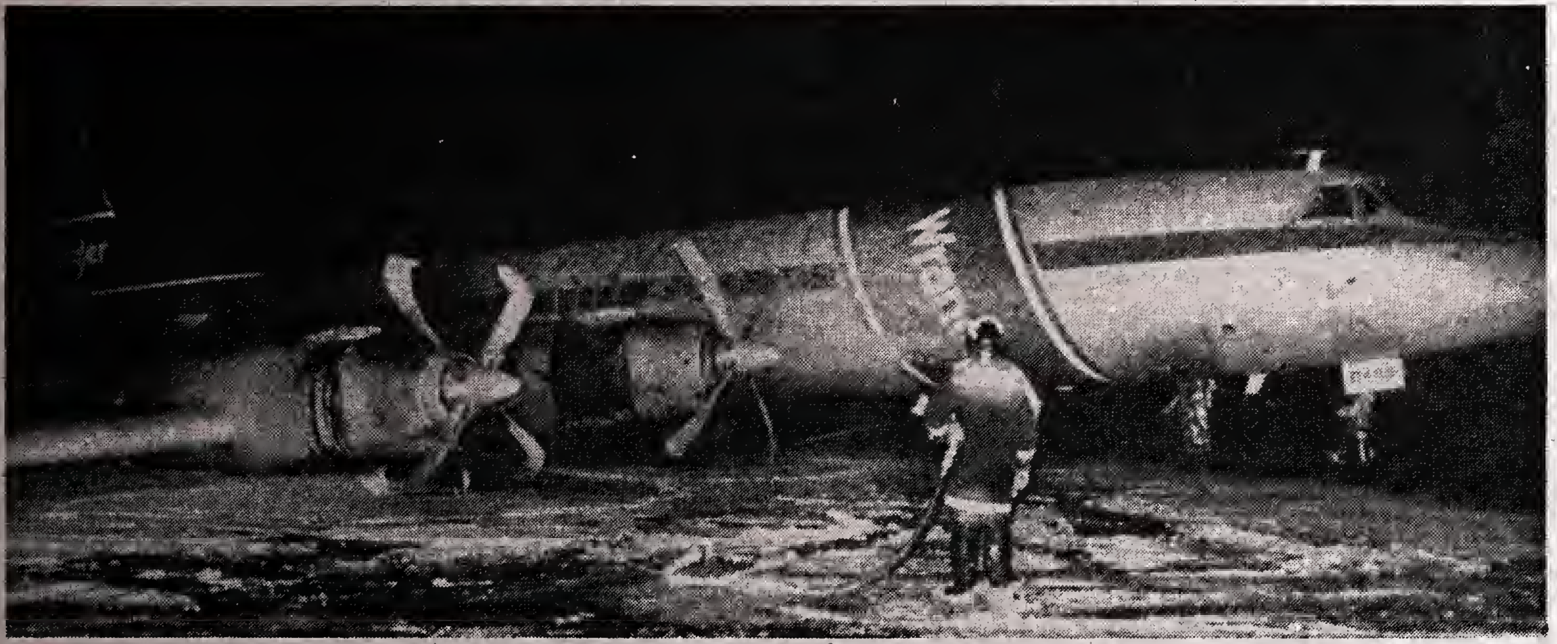
Application rejected

The FCC rejected that application because AT&T allegedly failed to show that denial of the waiver request would deprive customers of service or cause them to incur unreasonable costs. The commissioners thus reaffirmed their position that waivers will be granted only on narrow grounds.

Last summer, the FCC decided that wideband channel interfaces are CPE and must be offered by AT&T through its deregulated subsidiary, AT&T Information Services.

The commission also decided that the separate subsidiary rule applies to CPE marketed by the divested Bell operating companies, subject to certain modifications. (Notably, already installed NCTE and CSUs can be leased and maintained by the regulated side of each operating company.)

Last month, the FCC rejected several operating companies' arguments which sought to reverse these decisions.



Wide World Photos

A Canadair CL44 turbo-prop cargo plane carrying 24 tons of computer equipment made an emergency landing on New Year's Day at Boston's Logan Airport after its landing gear failed. Some of the computer equipment, en route from Puerto Rico to Worcester, Mass., included CPUs and spare parts belonging to Digital Equipment Corp. The four-man crew escaped uninjured. According to a DEC spokesman, none of the equipment appeared damaged.

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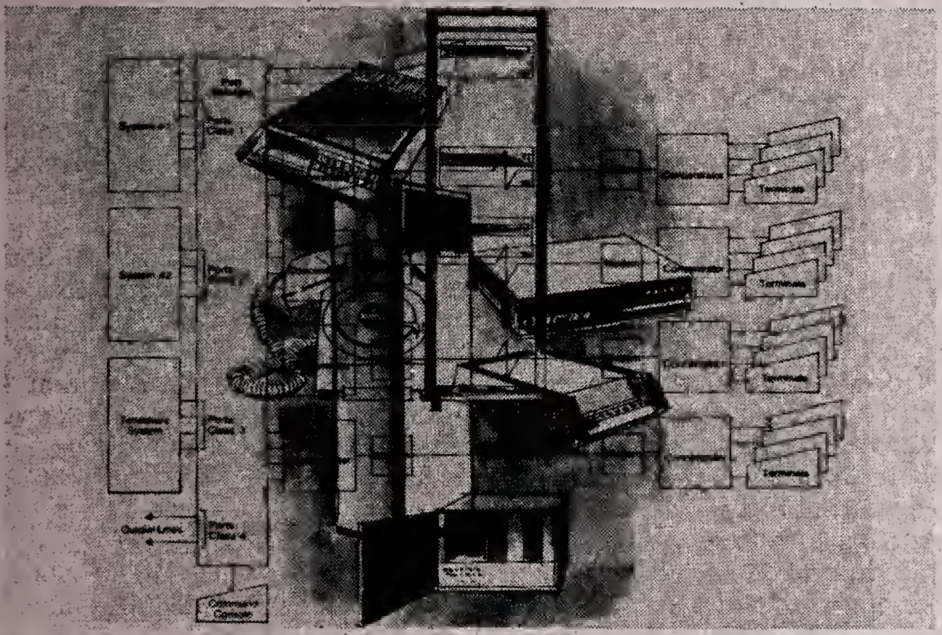

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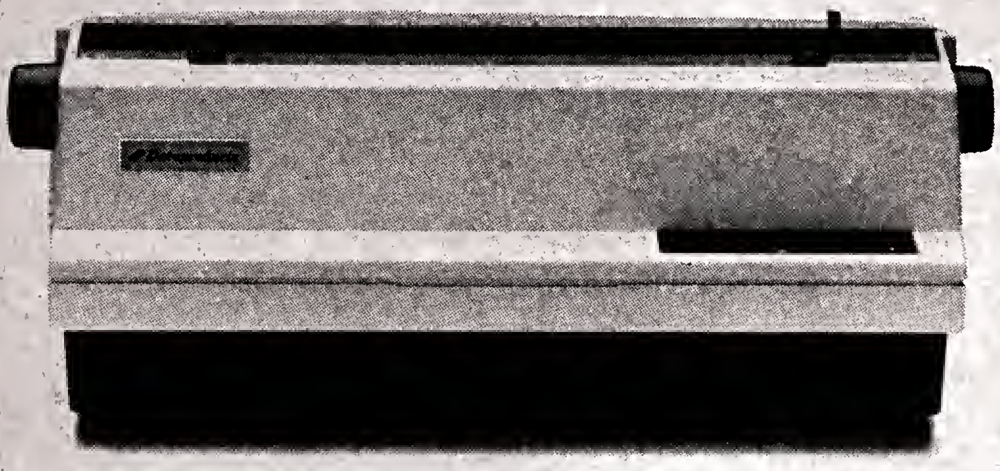

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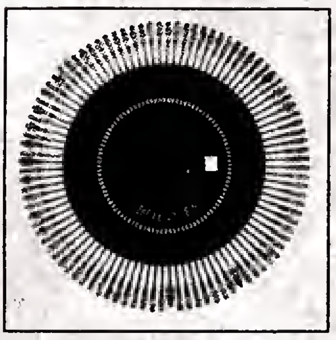


Dataproducts Daisywheel Printers

Commerce rapped for licensing fugitive dealer

By Peter Bartolik
CW Staff

WASHINGTON, D.C. — The alleged mastermind behind a foiled plot to smuggle a sophisticated U.S.-made computer system into the Soviet Union had received 14 earlier shipments of "critical technology" equipment, U.S. officials revealed during a recent press conference held jointly by Defense Secretary Caspar W. Weinberger and Treasury Secretary Donald T. Regan.

Anonymous "top Defense Department officials" quoted in *The Washington Post* late last month criticized the U.S. Commerce Department for failing to halt the 15 shipments to a West German national, Richard Mueller, who is still a fugitive from a 1979 federal indictment charging him with export violations [CW, Nov. 21, Nov. 28, 1983].

One part of the consignment containing Digital Equipment Corp.'s VAX-11/782 superminicomputer and other materials was displayed at a press conference last month following its return from West Germany; the other part of the consignment remains in custody of the Swedish authorities who intercepted it a week after the West German seizure.

Mueller 'under investigation'

Following the Weinberger-Regan press conference, an unidentified Defense Department official reportedly said Mueller "was under investigation by one part of the Commerce Department, while the other part of the Commerce Department was issuing licenses" to allow an unidentified New York-based computer broker and export company to purchase the equipment and ship it to the South African firm controlled by Mueller.

The official was quoted by *The Washington Post*, which said the official and others made comments under protection of anonymity during a "background briefing."

Dan Landa, a spokesman for the Commerce Department, said his department had no response to the allegations. Explaining export licensing procedures, however, he noted that licensees must agree upon issuance that the destination on the license is the end-user destination. An end user desiring to "re-export" equipment — ship it on to another country — must obtain permission from the Commerce Department.

"I mention that because that's what happened in the South African case," Landa said. "They had no right to re-export that [shipment]," Landa said.

The Defense officials quoted by *The Post* also reportedly said the Defense Department will soon place before the National Security Council a plan to stop the export of sensitive goods to communist nations.

During the cabinet-level news conference, Secretary Regan said the U.S. Customs Service, with the assistance of the West German authorities and the cooperation of the Defense Department, "prevented what would have been an espionage coup by the Soviets."

'Legal or illegal means'

The Soviet Union, he charged, "will go to great lengths to obtain high-technology equipment. Whether they have to use legal or illegal means, the [Soviet Union] will do what is necessary because it does not have the wherewithal to develop comparable technology."

Secretary Weinberger said the VAX-11/782 would help the Soviets "produce vastly more accurate . . . and more destructive weapons." Defense officials reportedly have said they suspected the Soviets intended to use the equipment to operate a design and manufacturing facility for production of high-speed integrated circuits.

Government officials have said the equipment can be used for a number of military applications, including simulation of missile-target encounters, logic design of military systems and "war gaming," among others.

High-tech smuggler still at large and still very much at work

> ***On Aug. 25, [1981], the U.S. Department of Commerce banned Richard Mueller and his company, Semitronic AG SA of Zug, Switzerland, from trading with U.S. companies until May 31, 2001. Mueller, it seems, had gotten caught exporting sophisticated computerized drafting systems to the Soviet Union.***
>
> ***It was not the first time Mueller had been implicated in illegal high technology shipments to the Soviets. It may not be the last time either. . .***
>
> — Computerworld, **Sept. 14, 1981**

Those prophetic words by freelance investigative reporter Christopher Simpson, part of a series of reports on high-tech smuggling he wrote for *Computerworld* in 1981, came true during the last two months of 1983. With more than 17 years of his "probation" still to be served, Mueller was implicated as the mastermind behind an attempt to smuggle a top-of-the-line Digital Equipment Corp. VAX-11/782 superminicomputer into the Soviet Union.

Mueller had previously fled the U.S. following a federal indictment handed down in 1979 that charged him with violating export regulations and exporting a complete assembly line for mass production of microcomputers to the Soviet Union. Two officials of a Sunnyvale, Calif., firm, II Industries, were convicted on charges related to the case.

Despite that indictment, *Computerworld* reported in 1981, "no sanctions were imposed against [Mueller] until the end of August [1981], and he continued to trade with U.S. companies."

Commerce criticized

Last month, it was reported in *The Washington Post* that top Defense Department officials strongly criticized the U.S. Commerce Department for allowing 15 shipments, including the VAX-11/782, to be exported to a South African firm controlled by Mueller.

The firm, according to those anonymous Defense Department officials, "was under investigation by one part of the Commerce Department, while the other part of the Commerce Department was issuing licenses." The Commerce Department declined to respond to the charges.

With the U.S. Congress still mired in controversy in attempting to renew the Export Administration Act [CW, Nov. 21, 1983], the current investigation into Mueller's dealings seems certain to play a key role in the Defense Department's attempt to gain greater discretion over the granting of export licenses. Export regulations remain in effect, despite the impasse in Congress, because of emergency powers invoked by President Reagan when the act expired late last year.

Although Mueller was well known to the Commerce Department as a result of two illegal export cases in the 1970s, the Customs Service revealed last month that he had received a total of 15 shipments of U.S.-manufactured "critical technology equipment" worth a total of $7 million including the VAX.

"None of these shipments remains in South Africa," customs officials said.

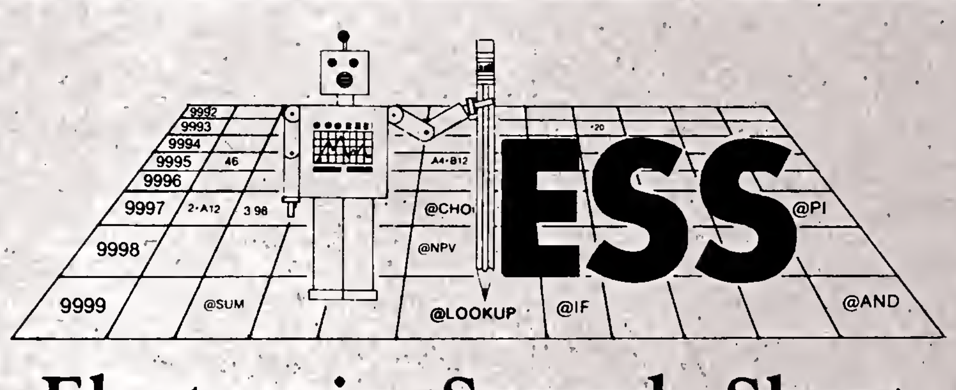
A customs investigation in South Africa revealed, according to customs officials, "that Richard Mueller, after making a sizable investment in commercial and residential real estate in South Africa, arrived there in January of 1983 and took up residence."

Established companies

Through several intermediaries, Mueller has established a number of shell companies in South Africa, beginning in 1979. These were funded through his Swiss holding companies and several Swiss bank accounts.

The customs investigation revealed that the millions of dollars worth of U.S. critical technology purchased by Mueller's firms from U.S. companies and exported to South Africa were funded through Swiss bank accounts.

One of Mueller's "front companies," Microelectronics Research Institute of Cape Town, South Africa, according to customs officials, was the importer of equipment "which was allegedly to be put into civilian electronics research by that firm," but was transferred to another "front company" that transferred it on paper to a Mueller subsidiary in Switzerland.



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Quality assurance shows top growth in corporate DP

By Patricia Keefe
CW Staff

ORLANDO, Fla. — Quality assurance is the fastest growing function in corporate DP, recording growth of 55% in 1983, according to an international survey by the Quality Assurance Institute (QAI). Additional growth of 33% is projected by June 1984.

The survey indicated that almost one-third of quality assurance groups were formed at the request of senior management, which is recognizing that need is making this function the top growth area in corporate DP, QAI added.

The survey results represent the responses of 135 organizations from a spectrum of fields, approximately one-third more responses than in 1982. The responding companies were either members of QAI or attendees at the third annual DPMA Quality Assurance Symposium.

Other changes

Other changes between 1982 and 1983 noted by the survey on DP quality assurance, which the QAI defined as being responsible for establishing and measuring a process that produces quality computer systems, include:

- A $25,000 increase in the maximum salary offered quality assurance managers in 1983 compared with the 1982 maximum of $40,000.
- An average salary in 1983 for quality assurance managers of $42,700, representing approximately a 10% increase over a year ago.
- An average age for the quality assurance function of two years and seven months, up from less than two years 12 months ago. However, the staffing ratio of full-time quality assurance professionals to systems analysts and programmers is less than 1:100 in 80% of the organizations that responded to the survey. "The less-than-desirable staffing ratio is attributed to the newness of the function," QAI said.
- The survey also found the same top three responsibilities for quality assurance managers in 1983 as in 1982: certifying systems prior to production status; enforcing DP standards; and reviewing and certifying development and documentation. Increasing in importance were developing system and programming standards, developing control standards and training.

The survey found that reporting hardware/software problems and monitoring adherence to in-place security measures reduced in importance to these managers.

For 53.3% of all the respondents to

See **GROWTH** page 18

Quality assurance success seen linked directly to exec support

ORLANDO, Fla. — The effectiveness of the quality assurance function in an organization is directly linked to the support — or lack of support — from DP management, according to the "1983 Survey of EDP Quality Assurance" by the Quality Assurance Institute (QAI) here.

"Quality assurance managers believe that they must have strong [DP] management support to be successful," QAI said.

The strengths and problems of quality assurance vary significantly from company to company and industry to industry, but overall, have not changed significantly since 1982, according to the international survey. The greatest strengths associated with DP quality assurance include knowledgeable and motivated staff, quality and respectability of staff, improved productivity and independence.

The problems considered most serious by the organizations responding to the QAI survey include:

- Lack of management support.
- Lack of skilled personnel.
- Lack of acceptance.
- Lack of standards and procedures.
- Time limitations.
- Getting credibility.

About half of all quality assurance groups listed management support of recommendations as the most important practice for enforcing quality, the survey said, underlining the importance of management support. Its respondents' two most popular methods for enforcing quality are controlling the source or object code library and stopping low-quality projects from continuing until corrective steps are taken.

The survey also found that the basis for evaluating quality in 42% of the organizations polled is compliance to standards. Thirty-eight percent use professional judgment, and 12% use mathematical methods.

Also cited as important to the quality assurance function is a knowledgeable and high-quality staff. Although the survey found that most of the quality assurance personnel come from DP, QAI said the function "requires skills other than data processing."

These skills, in order of importance, include verbal communication, written communication, systems analysis, interpersonal relations, knowledge of business and interviewing, time management and business systems design.

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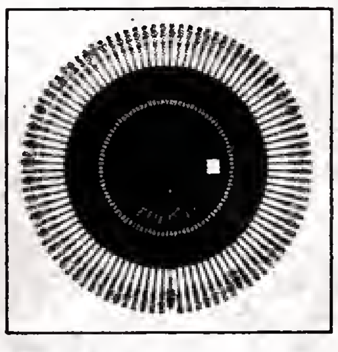

Dataproducts Daisywheel Printers

Akers to keynote NCC

LAS VEGAS — John F. Akers, president and director of IBM, is scheduled to be the keynote speaker for the 1984 National Computer Conference (NCC).

NCC '84 will be held here July 9-12 at the Las Vegas Convention Center; its theme is "Enhancing Creativity."

Akers, elected IBM president and a director in February 1983, joined IBM in 1960 as a sales trainee. He is a former group executive of the data processing marketing group and the information systems and communications group.

NCC is sponsored by several societies and institutions. They include the American Federation of Information Processing Societies, Inc. (Afips), the Association for Computing Machinery, the Data Processing Management Association, the Institute of Electrical and Electronics Engineers Computer Society and the Society for Computer Simulation.

Conference fees are $100 in advance or $125 on-site, according to Afips, which is located at 1899 Preston White Drive, Reston, Va. 22091.

Videotex meet set for April

CHICAGO — The Videotex '84 International Conference and Exhibition, featuring information on marketing, products and technology from the videotex industry, will be held here April 16-18 at the Hyatt Regency Hotel.

Sponsored by London On-Line, Inc., the conference theme is "Widening the Spectrum."

According to the conference organizer, it will feature three simultaneous conference sessions.

Talk shops

Among the sessions will be newly instituted "talk shops" to enable participants to follow the program elements specifically geared to their business interests.

"Videotex — The Full Picture" will cover basic aspects of the videotex industry, according to the conference organizer.

"Industry Issues and Developments" will focus on major strategic and technical issues.

"Talking Shop" includes more informal sessions where delegates will be able to exchange ideas on a variety of topics.

The registration fee is $695. After Feb. 29, the fee is $795, the organizer said. London On-Line is located at Suite 1190, 2 Penn Plaza, New York, N.Y. 10121.

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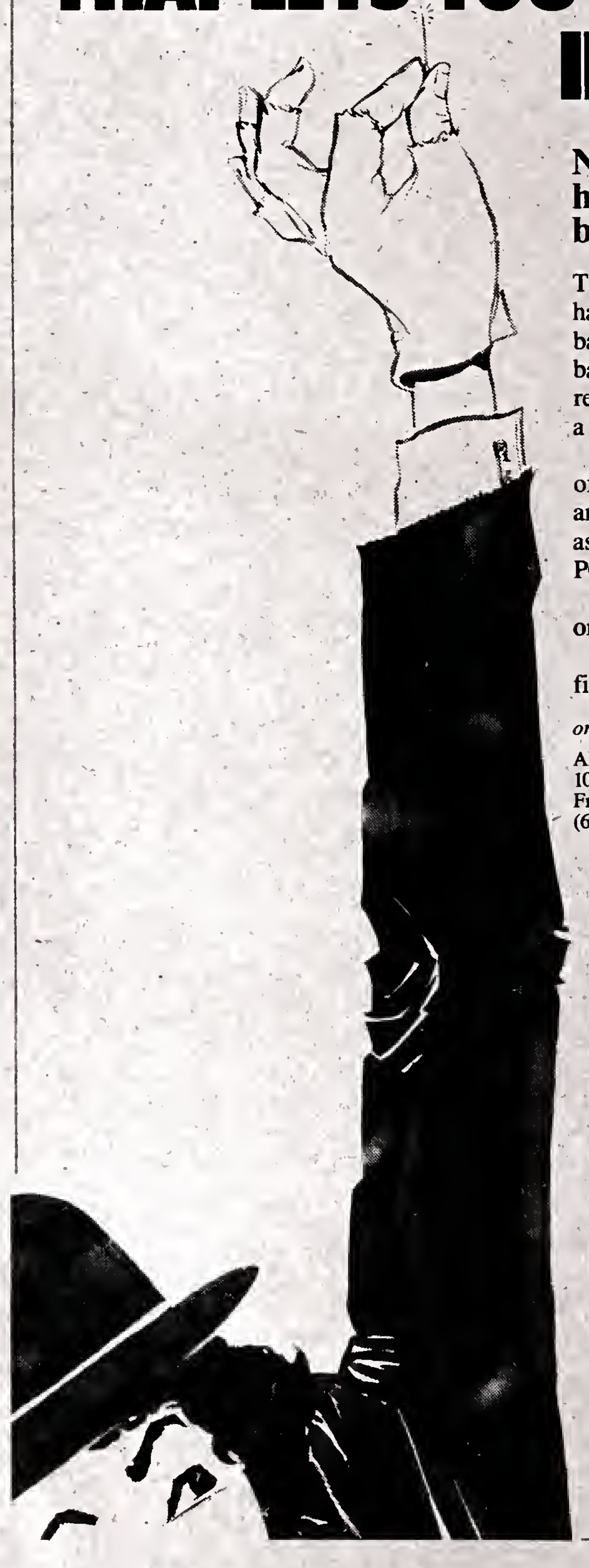

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GROWTH

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the survey, the average number of reviews per system development projects was one to three; when that question was asked only of the DP organizations that responded, the percentage rose to 75% for one to three reviews. This review process typically accounted for 2% to 5% of the project cost among the combined organizations (44.1%) and by 50% of responding DP organizations.

After the review, reports are issued by only 69% of the overall respondents (60.7% of the responding DP organizations).

Not cost-justified

In addition, 84% of the survey respondents do not cost-justify their function to management. Of the respondents who represented DP organizations, 67.9% do not cost-justify their function to management.

The majority of the quality assurance groups report to either the senior DP manager or the manager of DP support/planning. Less than 20% report to the manager of systems and programming and those that do "appeared to be the least effective in promoting quality data processing," the survey report said.

Quality assurance was found to flourish in organizations using formal design and maintenance methods. Approximately three-fourths of the organizations having quality assurance groups use formal system development life cycle methods, although close to half of the system development life cycle methods used were developed in-house.

Moreover, about half the quality assurance groups use a formal review process, such as review checklists, to ensure that quality is built in during the developmental process. Most often, survey respondents (52.8%), combined a review team with a quality assurance staff member to conduct these reviews.

During the review, over three-fourths of the quality assurance analysts responding use probing, the survey found.

Approximately one-half use questionnaires, 20% use checklists and 12% reported performing part of their analysis using software.

Copies of the survey are available for $25 if payment is included with the order ($35 invoiced). Copies are distributed to QAI members at no cost from Quality Assurance Institute, which is located at 9222 Bay Point Drive, Orlando, Fla. 32819.

INTERNATIONAL REPORT

CW INTERNATIONAL NEWS NETWORK

AUSTRALIA

NORTH SYDNEY — Austnet Electronic Funds Transfer (EFT) Services Pty. Ltd. has established an on-line link with the U.S.' Visa automated cash disbursement system. According to Austnet EFT's technical director, Chris Reilly, the company is the first EFT service outside the U.S. to link into the Visa system, enabling Visa card holders from anywhere in the world to withdraw cash instantly from Visa automated teller machines.

PERTH — A records management system that reportedly allows organizations to catalog and file all of their incoming and outgoing documents has been jointly developed here by Computer Power and the Systems Research Institute of Australia. The software was created for the Western Australian Government and will run on several different manufacturers' computers. It is presently up and running in the War Department of the Premier, and in the Department of Agriculture. It will next be implemented at the Metropolitan Water Authority and the Education Department.

BRAZIL

RIO DE JANEIRO — The Brazilian computer firm Cobra is reportedly facing a major crisis with the resignation of its president, Antonio Carlos De Loyola Reys. Without directly criticizing company shareholders, Loyola Reys attributed his resignation to the fact that resources were never allocated where most needed and that the role of the company, in terms of technological development, has never been clearly defined. According to Loyola Reys, the shareholders should allocate funds to relieve the company of debt and also rearrange the composition of shareholders to give the government absolute majority. It is not yet known who will replace Loyola Reys.

CHINA

BEIJING — China's largest domestically produced mainframe was unveiled here recently by the Research Institute of Computing Technology. The 64-bit Galaxy System 757 is capable of operating at speeds up to 10 million instructions per second, ten times faster than China's former top-of-the-line DJS 260 system. The System 757 has a main memory of 520K bytes and is intended for parallel processing in large-scale scientific and engineering applications.

FRANCE

PARIS — Carte Bleue, the credit card system developed by Intelmatique here with 3.3 million customers, has adopted "smart card" technology. Intelmatique will begin issuing the new cards, with memory, intelligence and security implanted in a microprocessor on the card in February.

JAPAN

TOKYO — Digital Research Japan has announced a Kanji version of its CP/M microcomputer operating system. Kanji CP/M has the ability to convert Kana and Roman letters into a Kanji phrase or sentence; the user simply inputs Kana or Roman characters and presses the Kanji conversion key. According to Digital Research Japan, Mitsubishi Electric Corp., Sanyo Electric Co. Ltd. and Sord Computer Corp. are among nine vendors that plan to adopt the Kanji CP/M operating system as a standard for their machines.

TOKYO — Toshiba Corp. has combined lens technology and convergent circuit technology to create a display of 10,000 characters on a 100-in.-high screen. The display system is said to have six different types of signal processing circuits that handle video and computer signals for large screen displays needed in video con-

See **REPORT** page 22

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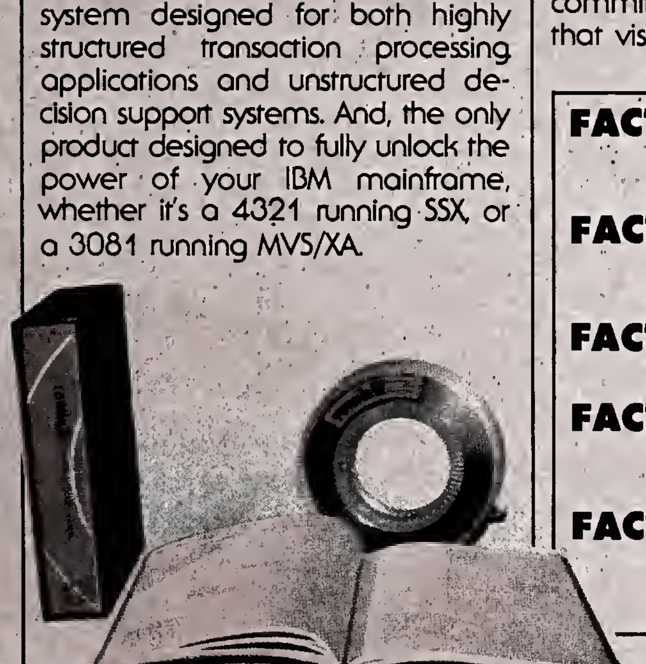

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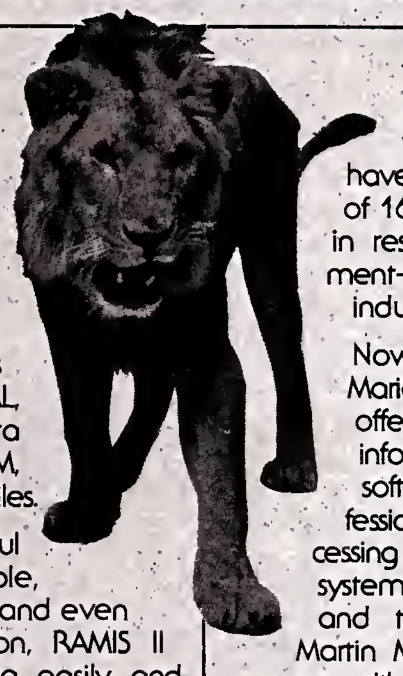

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Universal interconnection seen next interchange step

WASHINGTON, D.C. — Universal interconnection is the next major advance in electronic data interchange, according to T.J. O'Rourke, president of Tymshare, Inc.

He was among the speakers here last month at the annual meeting of the Transportation Data Coordination Committee (TDCC), which develops, maintains and promotes business use of electronic data interchange standards. Tymshare is a major supplier of on-line, computer-based communications/information services.

The first electronic data interchange standards, O'Rourke said, were "closed," limited to specified applications and required adherence to proprietary standards. Next came "open" systems, which did not require the use of any particular hardware, software or network service but did make adherence to a specific nonproprietary communications protocol mandatory. The grocery industry's Universal Communications Standard (UCS) is one such open standard, O'Rourke said.

He added that open systems are now beginning to be replaced by "generic standards," which contain the resources needed to resolve differences between user systems; thus, they make standards irrelevant. By promoting communications across company and industry boundaries, he expects generic standards to increase vastly electronic data interchange traffic.

At the TDCC meeting, Tymshare unveiled a service called Edi-Net which, according to O'Rourke, embodies a generic standard.

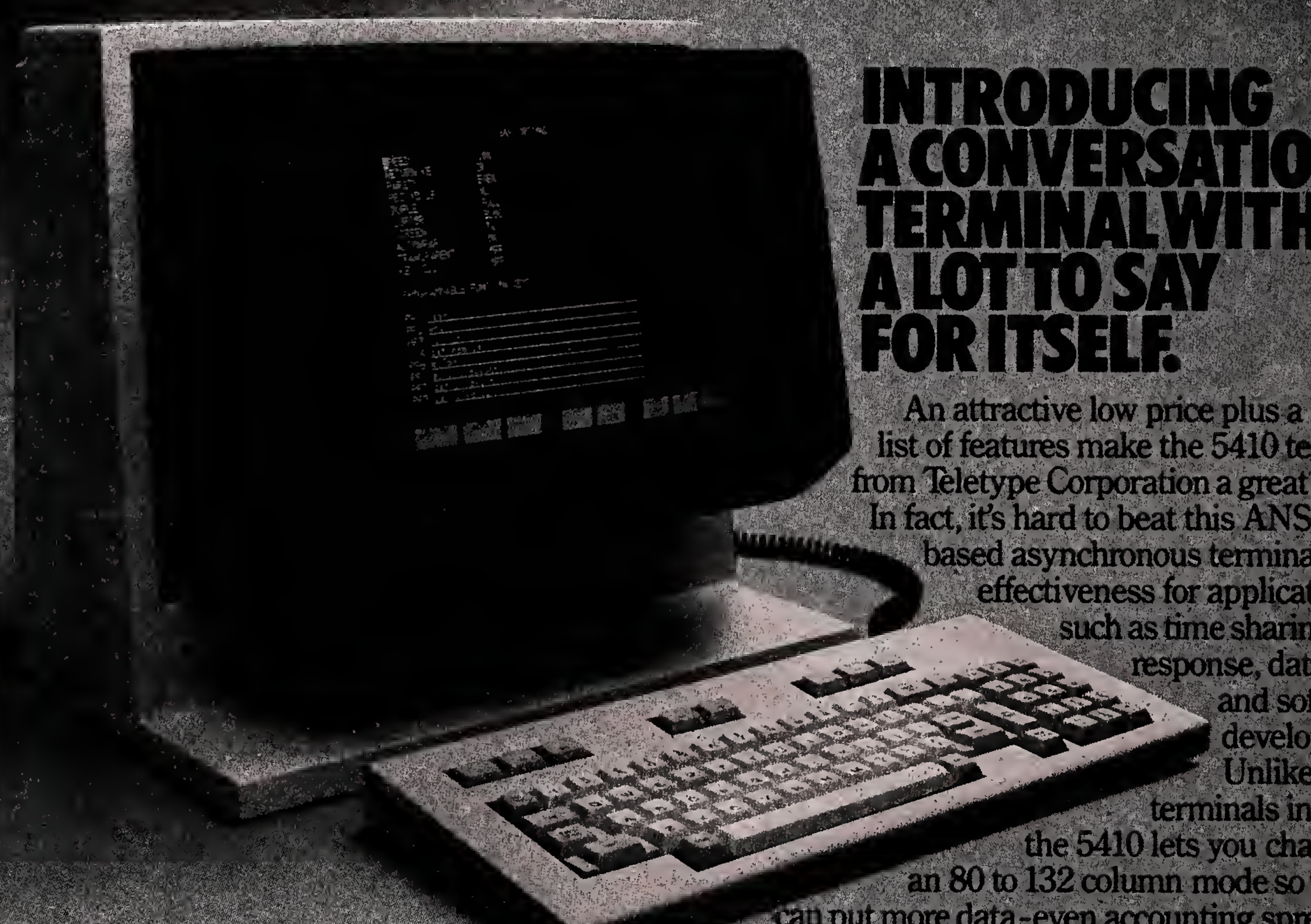
REPORT

from page 19

ferencing, superintendance control, propaganda, education and television broadcasting, a spokesman said. The product, including projector, video control unit, power unit and screen, costs about $2 million.

OSAKA — Sharp Corp. has introduced two multifunction Japanese word processing/personal computers. The WD 2200 and WD 2700 can also be remotely connected to an IBM host computer and emulate IBM 3270 terminals, the vendor said. The WD 2700 also has image scanning capabilities, along with hard disk and ink jet printer options. The WD 2200 with a thermal printer costs $4,247, and the WD 2700 is priced at $7,872 with dot matrix printer and $9,362 with an ink jet printer.

MATSUMOTO — Epson Corp. and Suwa Seikosha Corp. Ltd. have jointly announced Skymirror SM-10, a microcomputer designed to capture weather information from weather satellites and instantly display the data on a personal computer. Floppy disk drives or cassettes can be used to play back the weather data as needed. The system, priced from $9,574, can also be used as a standalone Japanese word processor and personal computer.



INTRODUCING A CONVERSATIONAL TERMINAL WITH A LOT TO SAY FOR ITSELF.

An attractive low price plus a long list of features make the 5410 terminal from Teletype Corporation a great value. In fact, it's hard to beat this ANSI 3.64 based asynchronous terminal's cost-effectiveness for applications such as time sharing, inquiry response, data retrieval and software development. Unlike most terminals in its class, the 5410 lets you change from an 80 to 132 column mode so that you can put more data - even accounting spreadsheets - on the screen. No matter which mode you're in, you'll get high resolution with crisp, easy-to-read characters.

The 5410 is also surprisingly user-friendly. For starters, it has 8 programmable function keys that can be down-line loaded from a host or entered locally by the operator. These non-volatile keys are easily associated with screen labels. When the operator goes to another application and changes the function keys, the screen labels can change right along with them. There's no need to put plastic strips or messy tape on the screen.

When it comes to optioning, the 5410 features an English menu (see screen above) for fast set up. The operators don't have to flip DIP switches or figure out complicated codes. They'll also appreciate the 5410's character attributes which include blinking, boldfacing, underlining, non-displayed and reverse video.

Of course, we had the operator in mind when we designed the 5410. That's evident in the detachable, low-profile keyboard that's light enough to rest on the operator's lap. And in the tiltable, non-glare screen with brightness control.

The 5410 also stretches to suit your needs as well as the operator's. For example, it features a standard EIA printer port; the internal software to do editing, split screen and line drawing graphics; and on-line speeds up to 19200 bps.

Another nice thing about the 5410 is its ability to diagnose its own problems. And that if service ever is needed, our established nationwide service organization lets us respond quickly to your call.

When you size up conversational terminals, we think you'll find our 5410 speaks for itself.

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In HERO, MDS offers a personal computer with the ability to contribute to, and draw from, an entire organizational information network. Integration replaces disintegration.

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INFORMATION FLOW THAT WAS NOT WORKING WILL NOW BE NETWORKING.

No more isolated little fiefdoms. No more anarchy. No more lack of central control. Coordinated with the MDS Communications Processor, HERO ties your information network together. Individual workstations can talk to each other. They can draw from departmental and corporate sources. And vice versa.

You keep your current network and HERO improves it. Your people keep their current jobs. They just do them better. Your investment is not only protected, it works harder.

And it all works for you.

MDS MERGES WITH IBM.

HERO marries compatibly into IBM networks. Using the MDS Communications Processor, HERO can talk with IBM mainframe computers. It's engineered to look like IBM 3270 SNA or 3776 remote job-entry systems. And our MDS Super SNA option lets you have both on one communications link. Most IBM and non-IBM protocols are available, including binary synchronous, asynchronous and X.25.

Only MDS offers you INTELLIGENT 3270.™ It integrates the intelligence of HERO with the intelligence of the host. User-written HERO programs can draw data from the host, process it, update it and return it. Or store it locally.

HERO DOES EVERYTHING A PERSONAL COMPUTER DOES. ONLY MORE HEROICALLY.

Since it's engineered to help you make decisions, HERO naturally provides word processing, financial spreadsheets, scheduling, analysis and planning functions. And it can run software under MS-DOS.

HERO is multilingual. It can understand programs written in FORTRAN, PASCAL and BASIC. As well as existing MDS Series 21® programs written in COBOL and MOBOL (Mohawk Business Oriented Language).

HERO HAS BRAINS TO MATCH ITS LOOKS.

With HERO's 16-bit processor comes memory expandable from 256K to one megabyte, with private disk storage up to 80 megabytes.

HERO is small, light and handsome. It fits snugly on the corner of a desk, and has the quiet, impressive good looks which inevitably find their way into the corner office.

Memory and storage modules are textbook size. They tuck away under a desk. With MDS, out of sight is never out of memory.

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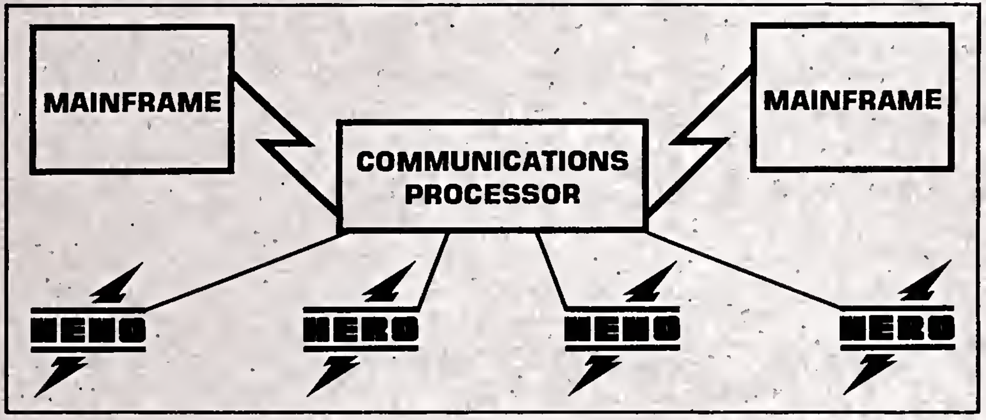
The MDS SUPER 21™ Communications Processor can cluster as many as 16 HEROS to a shared database. Each workstation shares the same disk drives, tape drives, printers, modems and communications lines.

And you share the savings. SUPER 21 provides two communications ports that operate simultaneously. It can talk to two different mainframes in two different protocols at once.



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HERO is designed to grow with your system. The modular sections are made to snap together. So it's a snap for a user to assemble, install and repair.

Built-in diagnostic "confidence tests" give you a sequential read-out, verifying that your HERO is healthy and ready to go.

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THE MDS PHILOSOPHY: UNITE AND CONQUER.

Twenty years ago, MDS set out to devise programs linking business systems together. Not just office automation—word processors and personal computing. Rather, automation for entire organizations: sophisticated networks linking remote locations together.

Over the years, by listening to our users and by responding to their specific networking needs, we've become acknowledged experts in automating the organization. By making this responsiveness our number-one priority, MDS has become a multidivisional, multinational networking organization.

We'd like to help you do the same. If you want to know more, we suggest two informed sources:

(1) Talk to our customers.
(2) Call us at **800-MDS-HERO.**

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ICA seminar set for Jan. 15-18 in Fort Lauderdale

Theme of meet — integrating the digital office

FORT LAUDERDALE, Fla. — The International Communications Association (ICA) will hold a seminar on digital telecommunications technology trends in management on Jan. 15-18 at the Fort Lauderdale Marriott Hotel and Marina.

The theme of the seminar will be "Integrating the Digital Office," focusing on alternatives for merging installed components of office automation into a unified system. The meeting will include a series of intensive sessions exploring a range of issues relating to digital technology and its implementation.

According to an ICA spokesman, seminar topics will deal with technical and management aspects of digital private branch exchange (PBX), transmission methods to interconnect advanced devices, evolving digital network standards and trade-offs related to bypassing local telephone company facilities.

The impact of deregulation will be examined in several sessions dealing with the divested local phone companies, the spokesman said.

The tuition fee for the seminar is $425 for ICA members and $450 for others. More information about the seminar is available from ICA headquarters at Suite 828, LB-89, 12750 Merit Drive, Dallas, Texas 75251.

AT&T chief to speak

NEW YORK — Charles L. Brown, chief executive officer and chairman of AT&T, will keynote a seminar here Jan. 26-27 on the business, legal and regulatory strategies of telecommunications companies.

"The New Telecommunications Landscape: The Companies Speak on the World of 1984 and Beyond" will be held at the New York Hilton by the *Legal Times* and Law & Business, Inc./Harcourt Brace Jovanovich, Publishers. Key executives from a variety of telecommunications companies and speakers from government, legal, financial and consulting organizations will participate.

Registration, including lunch and a reception, is $425 per person ($335 for representatives of nonprofit and government organizations).

Additional information is available from Law & Business/Harcourt Brace Jovanovich, 757 Third Ave., New York, N.Y. 10017.

Telexchange to hold meet

SAN FRANCISCO — The Fourth International Telexchange Meeting, scheduled at the Westin St. Francis Hotel here Jan. 16-18, will focus on system security, high-resolution computer graphics and micro-to-mainframe integration using Telefile Computer Products, Inc. and Xerox Corp. Sigma systems.

Sponsored by Telexchange, the Telefile Computer Users Group, the conference will also feature discussions on performance monitoring, state-of-the-art hardware and software development and additions to the users group library.

There will also be general business meetings and special-interest group meetings at the conference.

Registration costs $200. More information is available from Telexchange, 17131 Daimler St., Irvine, Calif. 92714.

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Interest bonus proves bogus for bank's customers

By James Connolly
CW Staff

COLUMBUS, Ohio — Some savings account customers at the Ohio State Federal Savings and Loan Association here recently got a surprise bonus in their passbooks. But their good fortune was nullified quickly by the computers that created it.

A misunderstanding between a service bureau and the bank caused computers to credit $100,000 to $200,000 in extra interest to more than 2,000 customers. The bank reclaimed that money within a week from disappointed but "understanding" savers.

"To this point, reaction from customers has been pretty understanding, once they knew what the situation was," said Stanley Spencer, vice-president for communications at Citizens Federal Savings and Loan Association, Ohio State's Dayton-based parent company. "Even most of the negative reaction was just, 'How did this happen?' When we explained it, they understood.

"It was just one of those freak things."

The error had its roots in the merger of the banks last year, when Citizens Federal, which used an NCR Corp. 8500 financial system, took over Ohio State Federal Savings, which utilized a Burroughs Corp. B4890 system through the Savings and Loan Data Center in Cincinnati.

Spencer said that Citizens Federal allowed a year to integrate Ohio State into the NCR system. Oct. 22, a Sunday, was chosen as the conversion date. "What happened was that they were projecting the interest a customer would earn through the end of the interest cycle, rather than cutting it off on Sunday," Spencer explained.

The data center continued crediting accounts through the week of Oct. 22, although the host computer at Citizens Federal was crediting interest as of the 23rd.

At the end of the week, when Citizens Federal received reports from the data center, officials noticed the excess interest paid. The extra interest averaged less than $50 per customer and probably did not exceed $200 for any single customer, Spencer said.

After discovering the error, the bank sent letters to between 2,000 and 3,000 Ohio State customers explaining the situation. Accounts were then reduced by the appropriate sum.

Spencer said the bank lost "little" money through customers closing accounts before the error was found.

Meet to cover fiber optics

MADISON, Wis. — A three-day program on the "Design of Fiber-Optic Communications Systems" will be held here March 12-14 at the University of Wisconsin Extension.

The program is structured to assist the design engineer and experienced technical personnel in the understanding and design of fiber optics in communications systems.

The program will be presented by industry leaders and will address subjects of fiber parameters, receivers and transmitters, optical measuring techniques, link design, cable installations and broadband applications.

The fee is $475. Further information is available from the Department of Engineering & Applied Science, University of Wisconsin Extension, 432 N. Lake St., Madison, Wis. 53706.

It's time the technology of data collection caught up to the technology of data processing.

The speed of your data processing is limited by the speed of your data collection and input. Unfortunately, for a lot of people, data collection technology stopped with the development of the clipboard.

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MSI systems eliminate paper shuffling, keypunching, and errors by collecting data at its source. At the same time, we return control to the data processing department, eliminate costly time delays, and match the sophistication of your central system with our equally sophisticated remote system.

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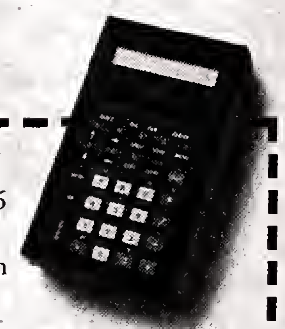
You'll find the technology of data collection is right where you want it.



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MANAGERS ON THE MOVE

BURT MALL has been appointed director of data processing at Intermatic, Inc. in Spring Grove, Ill.

Mall moved to Intermatic — manufacturer of automatic timers, outdoor lighting and heaters — from A.G. Becker Paribas, Chicago investment bankers, where he was manager of operations analysis. Prior to that, he was manager of data processing for 10 years at Northern Petrochemical Co., Inc., a division of Internorth Corp. in Des Plains, Ill.

Mall is a graduate of the Southern Illinois University in Carbondale with a B.A. in psychology and a minor in mathematics. He has completed work toward an MBA at Northern Illinois University in De Kalb, Ill.

■

CHARLES E. WOOD has been promoted to vice-president of information systems in the tire division of Copper Tire & Rubber Co. in Findlay, Ohio. Besides continuing to be responsible for computer operations, operations research and analysis, systems and systems planning, computer programming and office equipment, Wood gains additional responsibility as planning coordinator on the division's executive staff.

Wood was director of Cooper's data processing department from 1969 to this year, when the department was reorganized as Information Systems. He has held various managerial and supervisory positions in the systems and data processing areas since joining the company in 1959.

Wood holds a B.S. from Findlay College. He completed an advanced management program at Bowling Green State University in 1976 and has done graduate work there since 1980.

■

LEON B. BILLIS has been elected vice-president of The Equitable Life Assurance Society of the U.S. in New York. He will be responsible for planning for the company's computer centers.

Billis joined Equitable in 1963 as an operator in the data processing department. He was named a senior systems specialist in 1975, manager of the Technical Division in 1977 and manager of the Planning Division in 1978. He was elected assistant vice-president in 1980.

He is a 1974 graduate of Baruch College with a B.A. in business management. He received his MBA in executive management from St. John's University in 1970.

■

Sinisi

ALBERT A. SINISI JR. has been promoted to executive associate to the vice-president and director of technology resource management at Thomas Jefferson University in Philadelphia. In his new role, Sinisi will address issues governing the impact on Jefferson of new and advanced technologies. He will have general responsibility for recommending to the senior officers the policies and processes by which the university will manage the acquisition and assimilation of new technologies.

In his new post, Sinisi will be responsible for technology forecasting and planning, generally defining the capital, operating and human resources requirements of technology acquisition and coordinating the integration of complementary technologies, such as telecommunications and data processing. He will retain responsibility for completing Jefferson's new electronic data processing plan and will serve as the chairman of the technological subcommittee of the university's telecommunications committee.

Sinisi began his career at Jefferson in 1970 as a project manager in information systems and was promoted three years later to associate director, a position he held for the next five years before becoming director.

Prior to his work at Jefferson, Sinisi was a systems analyst at the General Electric Co.

In addition to his responsibilities at Jefferson, Sinisi is currently a member of the Mayor of Philadelphia's Advisory Board for Information Management.

He is a graduate of St. Louis University with a B.S. in aeronautics. He obtained his master's degree in business administration at Widener University in Chester, Pa.

Graphics, CAD/CAM covered by directory

CHERRY HILL, N.J. — Data Decisions, Inc. has published a directory of 66 graphics and computer-aided design and manufacturing (CAD/CAM) packages produced by 34 vendors. The packages run on mainframes, minicomputers and microcomputers.

Product descriptions are alphabetically arranged, preceded by a reference chart. It describes intended users, lists operating systems required and highlights functions and options.

The report, "Graphics and CAD/CAM," is available for $29 from the vendor.

Data Decisions is headquartered at 20 Brace Road, Cherry Hill, N.J. 08034.

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The Next Generation Dial-Up Computer Access System.

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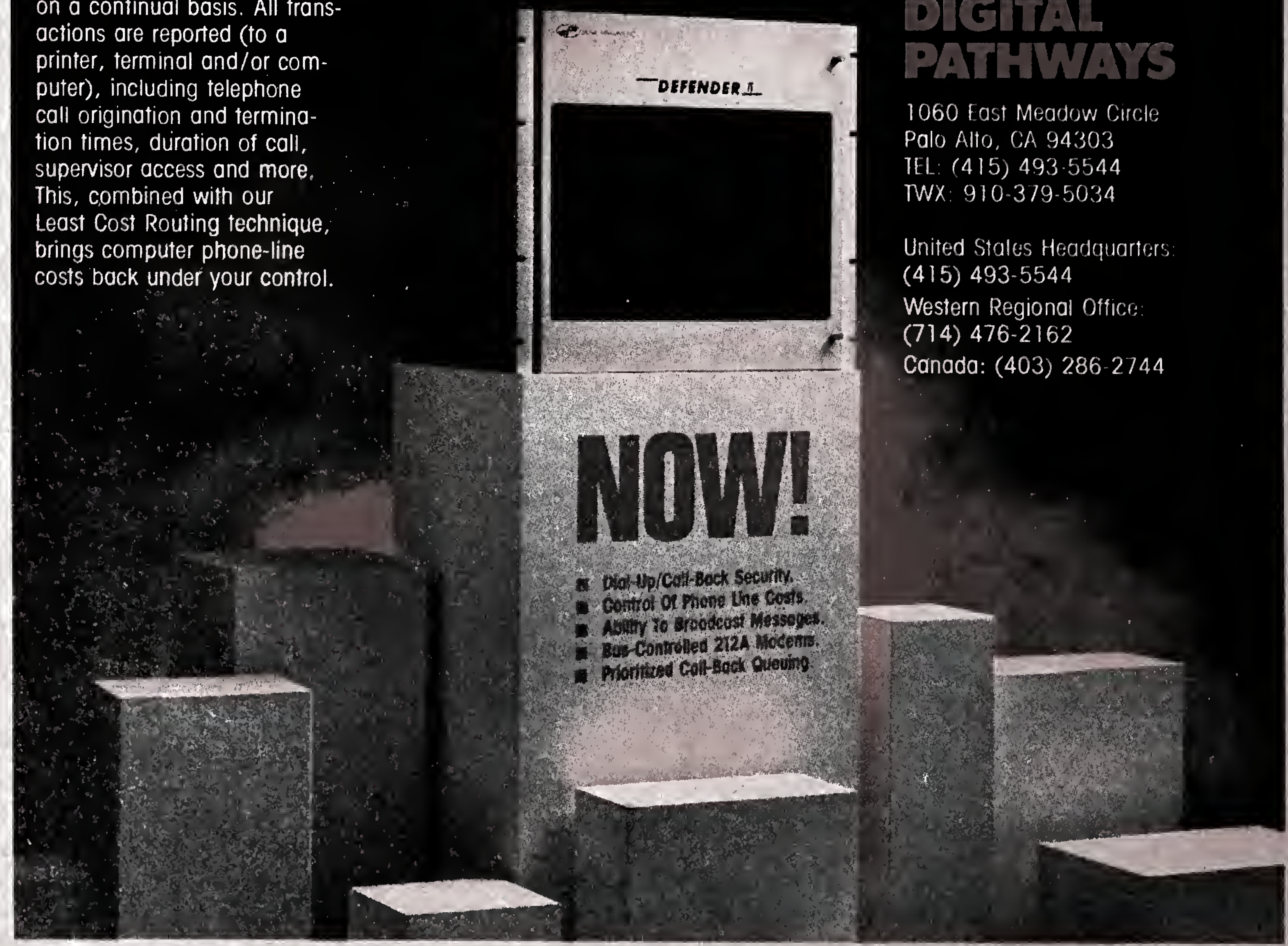
Defender II provides a unified approach to the intelligent management of dial-up modems at your computer site. Any number of Defender IIs can be configured with up to 48 modems each, and all may have their access controlled through dial-up/call-back procedures. That means security. For yourself. And, more importantly, for the information in your computer.

Each Defender II modem is monitored on a continual basis. All transactions are reported (to a printer, terminal and/or computer), including telephone call origination and termination times, duration of call, supervisor access and more. This, combined with our Least Cost Routing technique, brings computer phone-line costs back under your control.

Moreover, by utilizing Digital Pathways proprietary, bus-controlled 212A modems, Defender II offers something totally unique: the ability to automotically send messages to a predefined list of phone numbers — especially useful for distributing computer status information, product announcements to sales forces or any other mass-distribution message. This computer-independent messaging provides an invaluable tool in computer-down situations.

If you'd like to know more about how Defender II can help solve your dial-up computer access problems, call or write today for more information.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A HELIONETICS COMPANY

Computer chess champions

'Cray Blitz' wins chess trophy

NEW YORK — Belle, a seasoned champion, was unbeaten in 27 consecutive matches. Former champion Nuchess was in fine shape and looking for revenge. Built for speed, Cray Blitz was the top threat among the 20 other contenders.

After the dust had cleared at the triennial World Computer Chess Championship, held here in conjunction with the recent Association for Computing Machinery meeting, the developers of the Cray Blitz computer chess program walked off with the top trophy.

About half of the programs competing against each other for the crown of World Computer Chess champ were played on microcomputers. Although some of those micro-based contenders fought hard, they proved in the end no match for their bigger foes, some of which employed more than one processing unit.

Triumph over belle

Cray Blitz, which runs on a Cray Research, Inc. Cray-1/M series processor, battled to a draw with 1977 champion Nuchess in the tourney's fourth round and triumphed over 1980 champ Belle in the final round en route to the championship. The developers of the Cray Blitz program, Dr. Eugene Moore and Dr. Robert Hyatt of the University of Southern Mississippi, faced challengers from eight nations, including Canada, England, West Germany and Austria.

The loss of the title was particularly bitter for Belle, which operates on a Digital Equipment Corp. PDP-11/23 processor, as the U.S. Chess Federation had only recently recognized the former champion as the first chess program worthy of a national master rating.

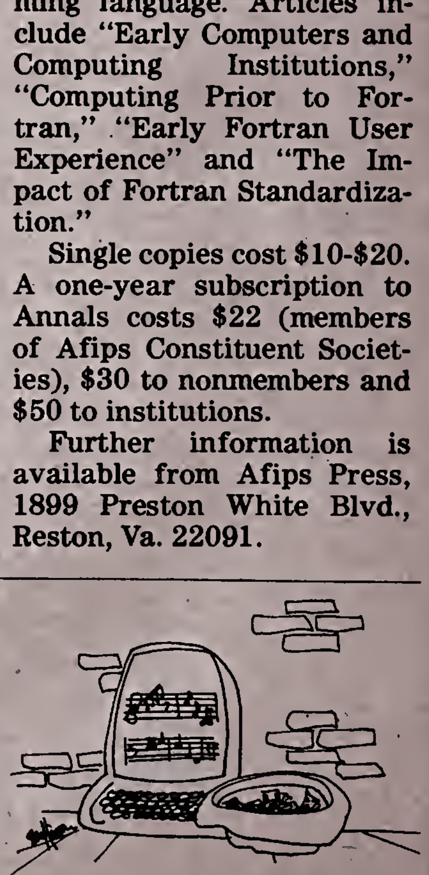
Journal covers Fortran's 25th

RESTON, Va. — The January 1984 issue of the *Annals of the History of Computing*, a quarterly journal published by the American Federation of Information Processing Societies, Inc. (Afips), is a special issue covering Fortran's 25th anniversary.

The issue contains 14 articles by original developers and users of Fortran, a widely used high-level programming language. Articles include "Early Computers and Computing Institutions," "Computing Prior to Fortran," "Early Fortran User Experience" and "The Impact of Fortran Standardization."

Single copies cost $10-$20. A one-year subscription to Annals costs $22 (members of Afips Constituent Societies), $30 to nonmembers and $50 to institutions.

Further information is available from Afips Press, 1899 Preston White Blvd., Reston, Va. 22091.



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3M diskettes remember everything, every time. Because at 3M, reliability is built into every diskette. We've been in the computer media business for over 30 years. And we've never settled in. We're constantly improving and perfecting our product line, from computer tape and data cartridges to floppy disks.

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Look in the Yellow Pages under Computer Supplies and Parts for the 3M distributor nearest you. In Canada, write 3M Canada, Inc., London, Ontario. If it's worth remembering, it's worth 3M diskettes.

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The complete Micro to Mainframe Data Link.
Available for installation TODAY.

INTERCHANGE/1 allows personal computer users complete access to mainframe data. PC programs can treat that data as if it were actually stored on the personal computer. ADABAS, IDMS, TOTAL and VSAM files can be accessed with simple GET, INSERT, UPDATE and DELETE commands, from standard PC programming languages.

INTERCHANGE/1 is the complete micro to mainframe link. It requires no special PC "database language", but instead extends PC BASIC and PASCAL by adding database manipulation commands. Several mainframe files may be accessed from a single PC program.

INTERCHANGE/1 supplies records on request, without the need for full file transfer, just as normal PC file processing does. It also allows sophisticated data "queries" through its programmatic "GET MATCH" command. You supply the criteria; INTERCHANGE/1 returns only those records which meet that criteria.

Where full file transfer is necessary **INTERCHANGE/1** provides both an UPLOAD and a DOWNLOAD utility. UPLOAD can be used to enter records interactively from the PC, or to transfer records from a PC file to the mainframe database. DOWNLOAD will allow transfer of mainframe files to the PC and will even prompt for MATCH criteria so that only the desired records are transferred.

INTERCHANGE/1 includes both the micro and mainframe interface. No user written mainframe program is required. Full mainframe security is provided and can be controlled at the central computer. The Data Center determines which fields in a file may be accessed by a particular user and assigns passwords to control the level of access (READ-ONLY, UPDATE, INSERT/DELETE).

INTERCHANGE/1 is a true micro to mainframe interface because it treats the microcomputer as an equal, not as a 3270 terminal.

INTERCHANGE/1 is the first in our CONTINUUM series of products for Distributed Data Processing (DDP). We are committed to supporting a true DDP environment.

INTERCHANGE/1 forms the basis for an integrated distributed resource system.

INTERCHANGE/1 currently supports mainframe ADABAS, IDMS, TOTAL and VSAM files and interfaces with the IBM Personal Computer. Support for additional mainframe database products, additional microcomputers (Apple, Wang) and additional "mainframes" (VAX, BURROUGHS, DATA GENERAL) are under development. Call us for details or special requests. If we don't have it now, we will build it for you.

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Within the next several months, at least a dozen micro/mainframe links will be announced by other manufacturers. To help you in evaluating the products which have been, or will be announced, we have prepared a booklet, in easy to understand "laymen's" terms, titled:

"All you need to Know about the
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Questions to ask your vendor."

The booklet describes what is necessary in a true micro to mainframe link, and explains some of the terms used to describe the various versions available. It will help you to determine what level of link you require for your environment.

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To futher assist your finding a product to meet your needs, WE have provided a list of those vendors we know who have already announced or will be announcing some form of micro to mainframe link. It is not exhaustive, and WE invite any vendor we miss to let us know, so we can include them in our next ad.

"Our Competition"

Cincom Systems, Inc. (Cincinnati, Oh.)
Computer Automation (Richardson, Tx.)
Computer Corporation of America (Cambridge, Ma.)
Cullinet Software (Westwood, Ma.)
Informatics General Corporation (Fairfield, N.J.)
Intel Corporation (Santa Clara, Ca.)
National Data Corporation (Fairfield, N.J.)
On-Line Software International (Fort Lee, N.J.)
PCI (Woodland Hills, Ca.)
Relay Software, Inc. (Columbia, S.C.)
Software AG of North America (Reston, Va.)

To receive your free copy of our booklet:
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TURNAROUND TIME

LARRY E. LONG

Q I was moved from development work into management information systems (MIS) planning about 18 months ago. Since that time I have completed two MIS plans. One was operational, and the other was in response to top management's request for a strategic plan for MIS.

Both plans have been well-received in the MIS department, but top management thinks our MIS strategic plan is still too operational. I've been asked by the director of MIS to revise the last plan to emphasize strategic planning. Do you have any suggestions about how to proceed?

A Many MIS "strategic" plans are no more than management summaries of more detailed operational plans that concentrate on new systems development, major enhancements and hardware upgrades. Top management's response to your strategic plan indicates to me that you may have fallen into this same trap.

You may be better off starting from scratch than trying to revise the MIS strategic plan. At this point, top management is not going to be satisfied with a revised operational plan. They want a plan that articulates those MIS strategies that are consistent with, and complementary to, corporate objectives.

If you haven't already done so, review the corporate strategic plan to see if it identifies any directions for MIS (often it does not). Invite input from corporate planners. Follow any corporate planning guidelines to the extent possible.

Keep in mind that top management wants a strategic plan that focuses on what has to be done to achieve specific results. Through a series of discussions with top management and MIS managers, derive a consensus of what the function of MIS is to be. Then set a series of strategic objectives.

In the plan, accompany each strategic objective with a brief explanation of how that objective is to be met. Each major planning area (sytems, hardware, personnel, operations, communications and so on) should be supported by at least one strategic objective.

For example, the strategic objectives for information systems planning might be to integrate existing and proposed information systems in a data base environment and to emphasize user friendliness and distributed data processing in systems design.

Finally, keep it to 20 pages or less.

Q I've conducted several in-house training sessions over the last three years on data base management and structured design. I enjoy teaching and would like to know what the career opportunities are in colleges and universities. Are there opportunities for part-time instructors?

A Academe is experiencing a desperate shortage of data processing and computer science instructors. In all likelihood, you need look no further than local institutions to find openings. Recruitment of both full-time and part-time faculty has become an ongoing task in most departments.

Q I'd like to add some specifics to your response to a person who was doomed to documenting dinosaurs. We follow these guidelines in updating the documentation of old systems and programs that have no documentation or poor documentation:

1. Documenting the data flow is more important than documenting the programs.
2. Set a time for documenting a system.
3. Begin with the identification of all programs (not program internals).
4. Compile data flow diagrams showing all I/O for each program (files, data sets, reports and screens).
5. Now, if time permits, identify the worst programs and list the programming tricks that they use.

A Your guidelines are good, but allow yourself enough flexibility to spend more time on the redocumentation of old systems that are extremely volatile and critical to organizational operation (and sometimes survival). Give these dynamic systems more attention than the relatively stable systems that have cumbersome but acceptable documentation.

Q I would like to work in Europe or perhaps South America for a few years, while I'm still young and unattached. I have five years' experience as a programmer/analyst. Will I be able to find a job?

A The best opportunities for employment are in the Third World countries and countries with oil-based economies. Jobs and work visas are more difficult to obtain in industrialized Europe.

Nationalism is strong in most countries, and employers prefer to hire their own, when possible. To get your foot in the door, you will probably need to demonstrate a specialized expertise and facility with the language. The oil countries are less demanding.

Long is a professor at Lehigh University, a DP consultant and author. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, *P.O. Box 880, Framingham, Mass. 01701.*

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Speaker cites next decade's concerns, players

By John Gallant
CW Staff

NEWTON, Mass. — Communications capabilities, computing power and memory will become increasingly inexpensive, but programming costs will be the fly in the ointment in the DP marketplace of the next decade, according to an industry expert who spoke here recently.

In addition, Robert G. Gilbertson Sr., president and chief executive officer of Data Switch Corp. of Norwalk, Conn., told the Boston Society for Information Management that IBM will "continue to cast a heavy shadow in the computer industry" with even more aggressive pricing and the introduction of new products.

According to Gilbertson, IBM's increasing dominance does not bode well for "the seven dwarves" — the mainframe vendors that do not make IBM plug-compatible machines.

IBM to dominate

"We will be dominated even more by IBM in the 1980s than we have been in the past. Within its corporate structure, IBM has created organizational groups that are designed to attack any chosen market through whatever means available. We've seen that clearly with the Personal Computer, and I think you'll see it with local-area networks also," said Gilbertson, a former IBM executive and faculty member of the Harvard Business School.

"In the mainframe market," he forecast, "it's clear that one or more of the non-plug-compatible manufacturers will retire by 1986 — and the first will probably be [Honeywell, Inc.]."

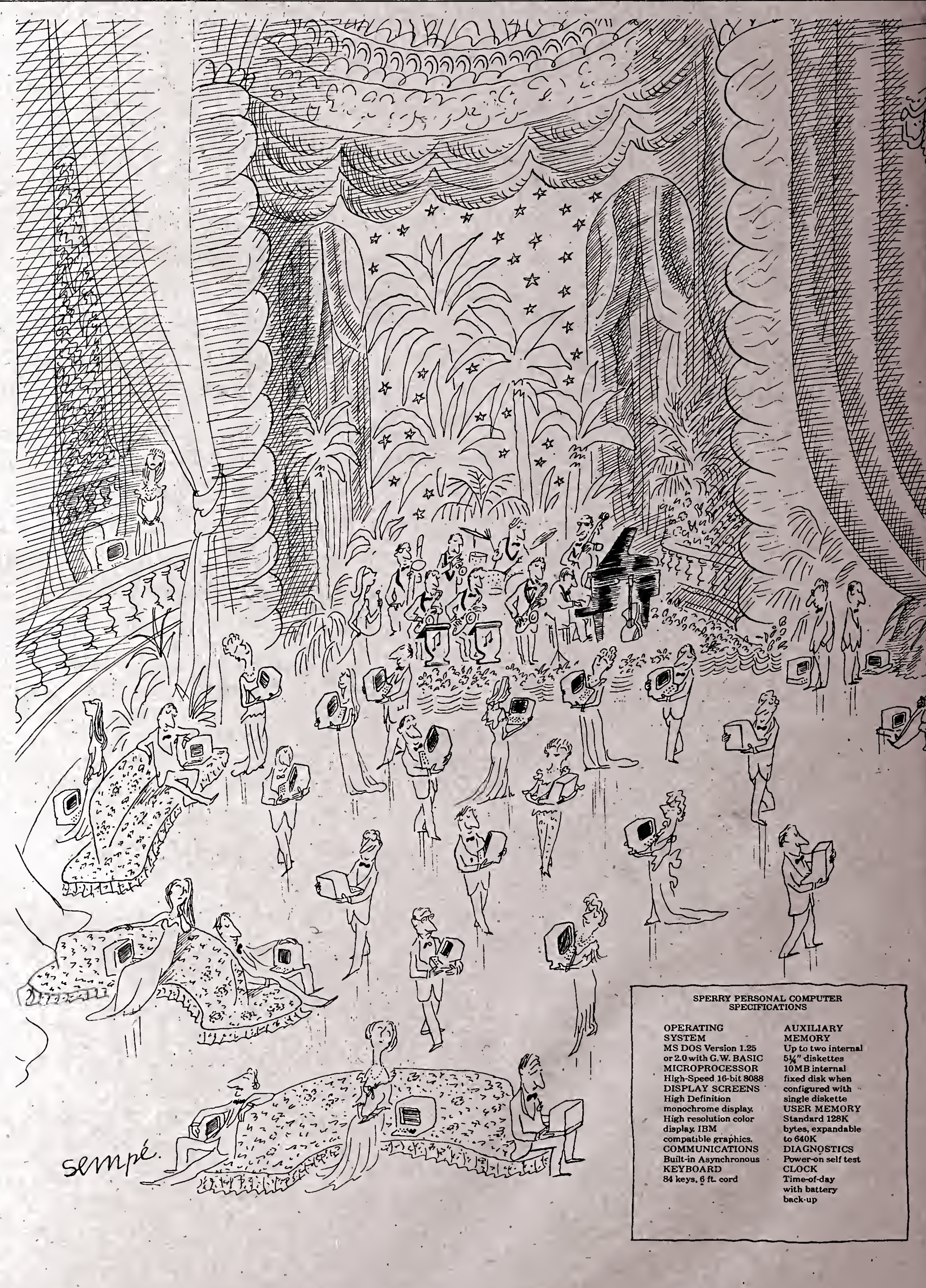
Gilbertson predicted that IBM's upcoming moves will include replacements for the 3080 and 4300 series processors, a new "fiber channel" for high-speed data delivery and a new emphasis on distributed processing, with the expected introduction of the token and star ring local-area networks.

In response, IBM compatibility will become an increasingly popular survival strategy. "We can have all the IEEE [Institute of Electrical and Electronics Engineers] and Ansi meetings we want, but IBM will continue to set the standards in the industry," Gilbertson said. "For example, when the token and star ring local-area networks are introduced, they will quickly obsolete all other offerings. In the micro area, competitors like [Apple Computer, Inc.] will have to become IBM-compatible to withstand market pressures."

The private and government sectors will spend more than $1 trillion in the next five years for DP services — a vast sum, but one that Gilbertson said will purchase "huge capabilities." Processing power will become cheaper, as will additional memory capacity, although he predicted that cost savings for increased storage will level off as "designers reach the electromechanical limits of these devices."

More important, "telecommunications costs will drop even faster in the unregulated environment of the next decade," Gilbertson predicted. "It will become more and more economical to divide your processing resources, to move away from the idea of one central processing location."

But the "kicker" in all the good news, he said, is that programming costs will rise with the introduction of ever more new products requiring ever more sophisticated code. "It has been estimated that one line of Cobol code costs about $14. That cost won't fall. We're getting better at writing bug-free code, but we aren't getting any more efficient at producing code."



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CALENDAR

WEEK OF JAN. 15

JANUARY 16-17, BOSTON — **Data Communications for Personal Computers.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

JANUARY 16-17, DALLAS — **Micro/Personal Computers: Comparative Analysis and Implementation Guidelines.** Contact: Software Institute of America, 339 Salem St., Wakefield, Mass. 01880. Also being held Jan. 19-20 in Los Angeles.

JANUARY 16-17, SAN FRANCISCO — **Managing Projects in the Structured Environments.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JANUARY 16-17, DALLAS/RICHARDSON, TEXAS — **Dbase II.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Jan. 18-19 in Houston, Jan. 23-24 in San Francisco and Jan. 25-26 in San Jose, Calif.

JANUARY 16-18, ATLANTA — **DP Auditing and Controls.** Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

JANUARY 16-18, PHOENIX — **Data Communications Systems.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Jan. 25-27 in Arlington, Va.

JANUARY 16-18, ATLANTA — **Auditing Advanced Computer Systems.** Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

JANUARY 16-18, RALEIGH/DURHAM, N.C. — **Personal Computers and Networking.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

JANUARY 16-20, TRUMBULL, CONN. — **Advanced Unix.** Contact: Gregory Geiger, Bunker Ramo Information Systems, Trumbull Industrial Park, 35 Nutmeg Drive, Trumbull, Conn. 06609.

JANUARY 16-20, NEW YORK — **Structured Analysis and System Specification Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Jan. 16-20 in Chicago and Jan. 23-27 in Boston, Seattle and Columbus, Ohio.

JANUARY 16-20, BOSTON — **Structured Analysis and Design Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Jan. 16-20 in Minneapolis, New York and Salt Lake City and Jan. 23-27 in Denver and Pittsburgh.

JANUARY 16-20, COLLEGE PARK, MD. — **Unix Workshop.** Contact: Plum Hall, One Spruce Ave., Cardiff, N.J. 08232.

JANUARY 16-20, HOUSTON — **Structured Analysis for Real-Time Systems.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Jan. 23-27 in San Francisco.

JANUARY 16-20, WASHINGTON, D.C. — **Unix and Software Tools.** Contact: Mark Weber, Professional Exposition Management Co., Inc., Suite 205, 2400 E. Devon Ave., Des Plaines, Ill. 60018.

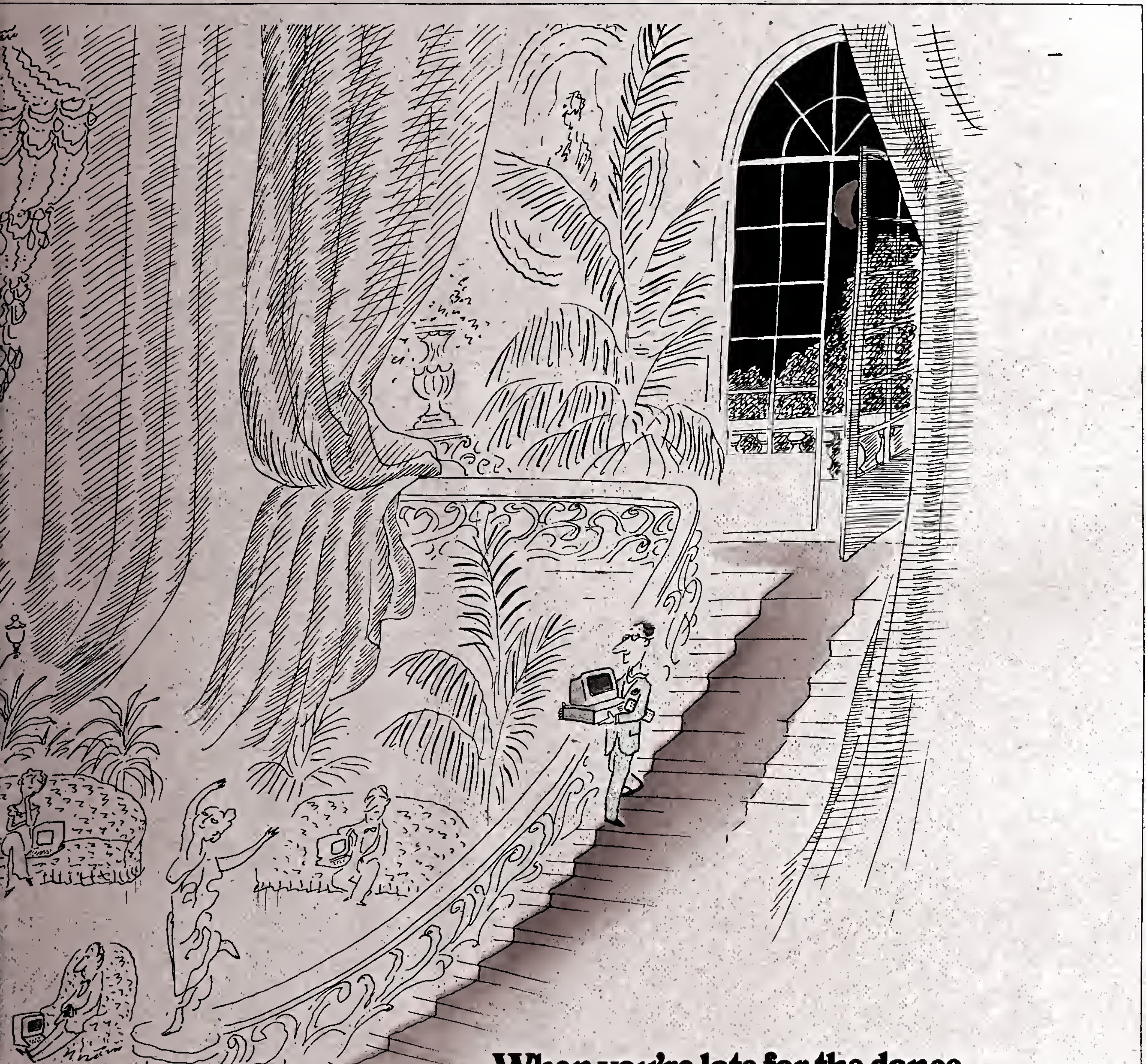
JANUARY 16-20, NEW YORK — **Structured Programming Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JANUARY 16-20, TRUMBULL, CONN. — **C Programming.** Contact: Gregory Geiger, Bunker Ramo Information Systems, Trumbull Industrial Park, 35 Nutmeg Drive, Trumbull, Conn. 06609.

JANUARY 16-20, BOSTON — **Structured Design Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Jan. 16-20 in Portland, Ore.

JANUARY 16-20, DENVER — **Information Modeling Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Jan. 16-20 in Denver, Raleigh, N.C., and Washington, D.C.

See DATES page 38



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DATES

from page 37

JANUARY 17-18, PHOENIX — **Local Networks in the Factory.** Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424.

JANUARY 17-19, KANSAS CITY, MO. — **1984 Midwestern Telecommunications Showcase.** Contact: U.S. Telecommunications Suppliers Association, Suite 1618, 333 N. Michigan Ave., Chicago, Ill. 60601.

JANUARY 17-19, ORLANDO, FLA. — **Southcon/84 High-Technology Electronics.** Contact: Electronic Conventions, Inc., 8110 Airport Blvd., Los Angeles, Calif. 90045.

JANUARY 17-19, ORLANDO, FLA. — **Mini/Micro Southeast '84.** Contact: Electronic Conventions, Inc., 810 Airport Blvd., Los Angeles, Calif. 90045.

JANUARY 17-20, PALO ALTO, CALIF. — **Data Base Management Systems: Mini, Micro and Distributed Applications.** Contact: Integrated Computer Systems, 3304 Pico Blvd., Santa Monica, Calif. 90405.

JANUARY 17-20, LOS ANGELES — **Practical Structured Techniques for Software Design and Coding.** Contact: Integrated Computer Systems, 3304 Pico Blvd., Santa Monica, Calif. 90405.

JANUARY 17-20, WASHINGTON, D.C. — **Hands-On Pascal Workshop.** Contact: Integrated Computer Systems, 3304 Pico Blvd., Santa Monica, Calif. 90405.

JANUARY 17-20, WASHINGTON, D.C. — **Software Project Management: Micro and Minicomputer Software Engineering.** Contact: Integrated Computer Systems, 3304 Pico Blvd., Santa Monica, Calif. 90405.

JANUARY 17-20, WASHINGTON, D.C. — **CAD/CAM Systems.** Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045.

JANUARY 17-20, BALTIMORE — **Computer Network Design and Protocols.** Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held Jan. 24-27 in Palo Alto, Calif.

JANUARY 17-20, ANAHEIM, CALIF. — **Microprocessor Software, Hardware and Interfacing.** Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045.

JANUARY 17-20, SAN DIEGO — **Programming in C: A Hands-On Workshop.** Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045.

JANUARY 17-20, SAN DIEGO — **Data Communications.** Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held Jan. 31-Feb. 3 in Washington, D.C.

JANUARY 18-20, DENVER — **Data Base Management.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Jan. 25-27 in Washington, D.C.

JANUARY 18-20, INDIANAPOLIS — **Local-Area Networks.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Jan. 25-27 in Boston.

JANUARY 18-20, CHICAGO — **Network Communications Protocols.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Jan. 25-27 in Raleigh/Durham, N.C.

JANUARY 18-20, COLUMBUS, OHIO — **Unix.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Jan. 25-27 in Minneapolis.

JANUARY 19-20, ATLANTA — **Creative Use of Audit Software.** Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

JANUARY 19-20, NEW YORK — **Fourth-Generation Data Management Software.** Contact: Software Institute of America, 339 Salem St., Wakefield, Mass. 01880. Also being held Jan. 30-31 in Seattle.

JANUARY 19-20, NEW BRUNSWICK, N.J. — **Data Communications for Personal Computers.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held

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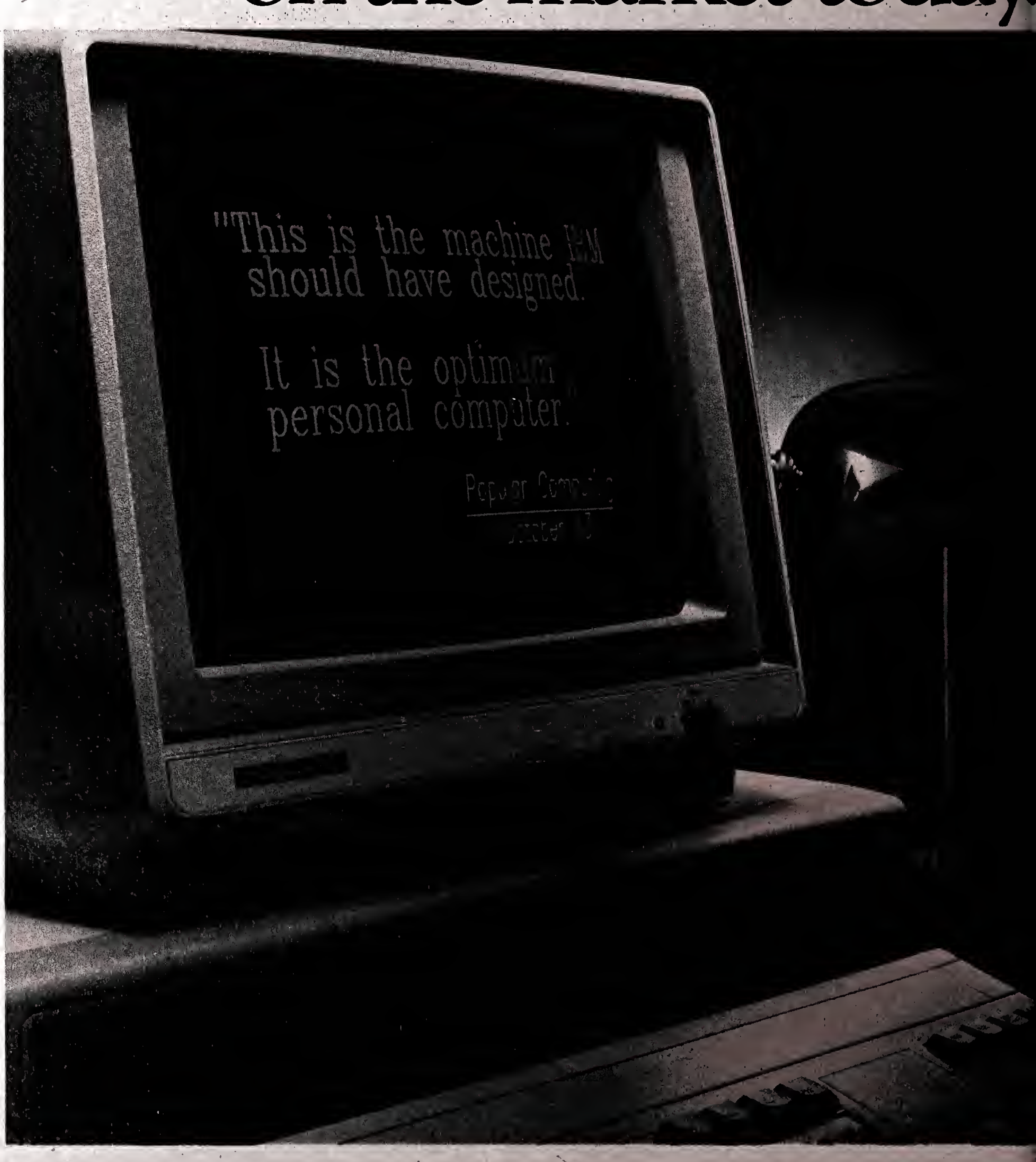

Jan. 30-31 in Los Angeles.

JANUARY 19-21, PASADENA, CALIF. — **Datawest '84.** Contact: Layna J. Browdy Berkhemer and Kline, Inc., Suite 250, 261 S. Figueroa St., Los Angeles, Calif. 90012.

JANUARY 20, LOS ANGELES — **CICS/VS Concepts and Facilities.** Contact: Teltech, 39 Broadway, New York, N.Y. 10006. Also being held Jan. 23 in New York.

WEEK OF JAN. 22

JANUARY 23, HOUSTON — **Successful Strategies for Acquisition and Control of Microcomputers: The Revolution.** Contact: Datamation Institute, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167.

JANUARY 23-24, NEW YORK — **The Impact of the Computer Revolution 1984-2001.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JANUARY 23-24, ORLANDO, FLA. — **Software Configuration Management.** Contact: Education Foundation of the Data Processing Management Association, Department SCM, P.O. Box 3608, 3420 Kashiwa St., Torrance, Calif. 90510. Also being held Jan. 26-27 in Boston and Jan. 30-31 in Washington, D.C.

JANUARY 23-25, NEW YORK — **CICS/VS Application Programming.** Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

JANUARY 23-25, MILLBRAE, CALIF. — **Surge Protection of Computers and Other Electronic Systems.** Contact: Francis P. Drake, Department of Engineering and Applied Science, University of Wisconsin Extension, 432 N. Lake St., Madison, Wis. 53706.

JANUARY 23-25, HUNTSVILLE, ALA.— **Personal Computers and Networking.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Jan. 30-Feb. 1 in Toronto.

JANUARY 23-26, FORT LEE, N.J. — **Vtam: From Start to Finish.** Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

JANUARY 23-26, ATLANTA — **Vsam: Its Structure and How to Use it.** Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

JANUARY 23-26, FORT LEE, N.J. — **IMS/DB (DL/1) Application Programming.** Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

JANUARY 23-27, SALT LAKE CITY — **Information Modeling Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JANUARY 23-27, TRUMBULL, CONN. — **Practical Data Communications.** Contact: Gregory Geiger, Bunker Ramo Information Systems, Trumbull Industrial Park, 35 Nutmeg Drive, Trumbull, Conn. 06609.

JANUARY 23-27, LOS ANGELES — **Advanced Structured Analysis.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JANUARY 23-27, COLLEGE PARK, MD. — **C Programming Workshop.** Contact: Plum Hall, One Spruce Ave., Cardiff, N.J. 08232.

JANUARY 23-27, DALLAS — **Structured Program Design and Maintenance.** Contact: Georganna Carson, Ken Orr and Associates, Inc., 1725 Gage Blvd., Topeka, Kan. 66604.

JANUARY 23-27, NEW YORK — **CICS Command-Level Programming.** Contact: SYS-ED, One Park Ave., New York, N.Y. 10016.

JANUARY 23-27, ORLANDO, FLA. — **CICS Programming.** Contact: Harris Education Center, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

JANUARY 23-27, WASHINGTON, D.C. — **Data Communications for Microcomputers.** Contact: George Washington University, Washington, D.C. 20052.

JANUARY 24-26, NEW YORK — **CICS/VS Command-Level Debugging.** Contact: Teltech, 39 Broadway, New York, N.Y. 10006.

JANUARY 24-26, PHOENIX — **Data Communications Concepts.** Contact: Suzanne Galliart, Memorex Customer Education, M/S 03-16, 3393 Octavius Drive, Santa Clara, Calif. 95051.

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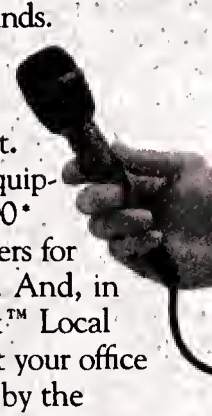

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EDITORIAL

And now, 1984

How perfect! We enter 1984, trying to shrug off George Orwell's dire warnings of government control and surveillance, only to find there is a proposal to expand drastically the Federal Bureau of Investigation's capability to monitor electronically noncriminals.

The proposal to expand the bureau's National Crime Information Center network to surveil "associates" of certain types of criminals is only in very preliminary discussion and may go no further.

But the trend is very disturbing. Last year the FBI and the Secret Service turned the NCIC, an interstate criminal records exchange system, into a national surveillance system by adding a file to monitor the activities of persons of interest to the Secret Service.

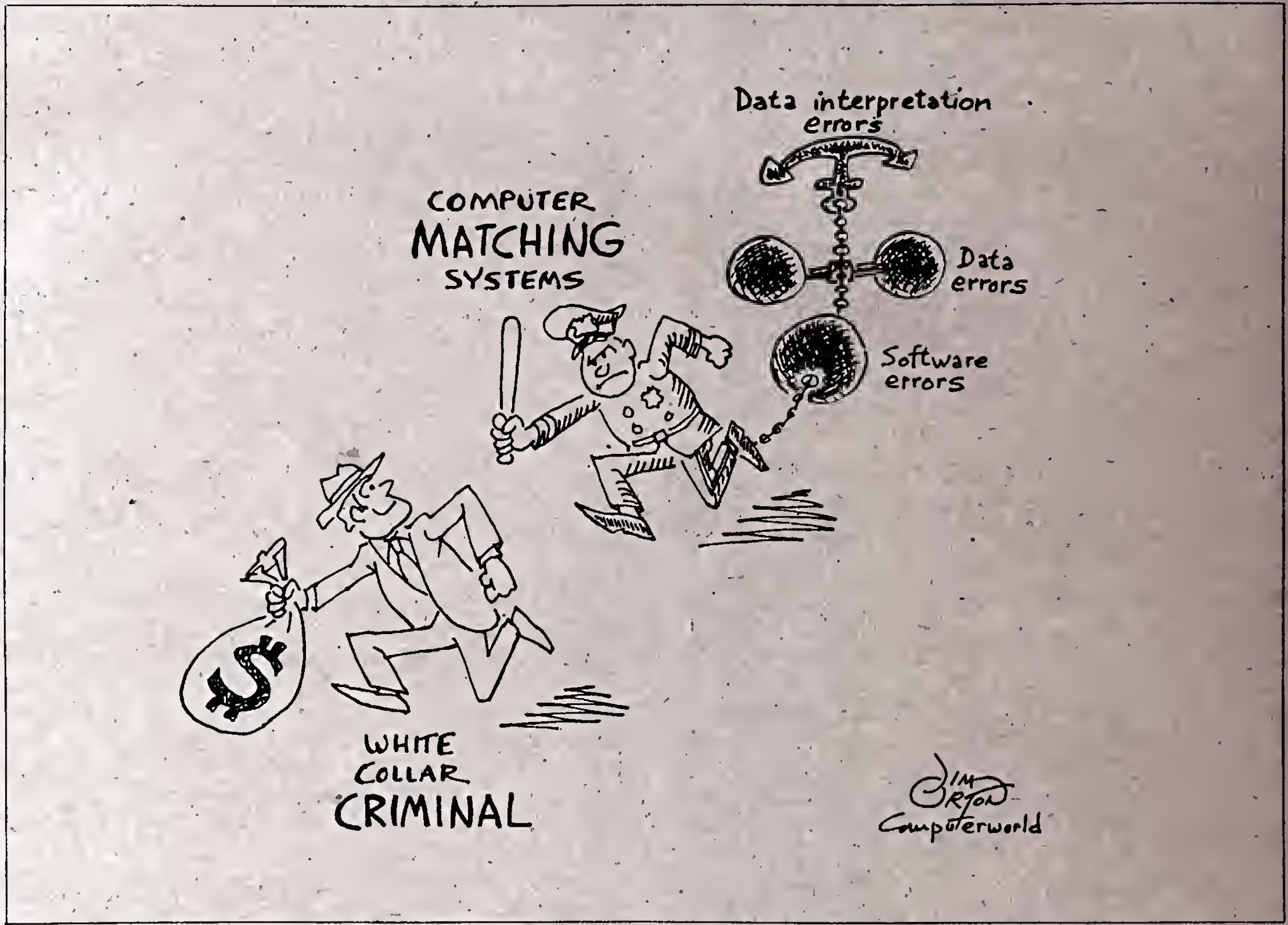
A congressional oversight subcommittee said the file was illegal, but the FBI claimed it was needed to protect the president. Now the FBI can claim it needs further surveillance capabilities to stop terrorists, drug runners and foreign spies.

Some, no doubt, will wonder why the FBI didn't have this capability before and why it should not have it now. Of course law enforcement should have the tools to stop terrorists and spies, but the NCIC should not be one of them. That system was designed to provide data to thousands of police officers and court officials across the country. These people surely are not the first line of defense against terrorists or spies.

More importantly, in some states the network is open to anyone and is used by many firms to see if job applicants have criminal records. What happens when your cousin, unknowingly in an NCIC "known associate" file because she babysits for a mobster's sister-in-law, goes looking for a job or is stopped for speeding? She might be denied a job or find a policeman, alerted to the NCIC "hit," pointing a gun at her.

That sounds far-fetched, but without some statutory guidelines, who knows what kind of information will go into this kind of file? And police system "computer errors" have resulted in the jailing and death of innocent people before.

It is frightening to consider what might happen if this sort of activity is allowed without specific legal authority. If the FBI can use records systems to monitor individuals, why can't other government agencies or even private corporations? In Orwell's novel, people were constantly monitored by the government. Now, it seems, in the real 1984 we might have many Big Brothers.



Handicap race

LETTERS TO THE EDITOR

Problems not common to all environments

In Barry L. Abramson's article, "Reducing Security Risks Associated With VM Access" [CW, Dec. 5], Abramson cites several security-related problems he has perceived in his organization's use of IBM's VM operating system and outlines the steps he has taken to address them. The article implies that these problems arise from operating system shortcomings and suggests that they might be corrected in future versions of VM.

Judging by the descriptions given, these problems are due mainly to the manner in which the operating system is used and are not common to all VM application environments. The solution techniques described employ standard tools provided to users by the operating system for that purpose and others and are not, strictly speaking, modifications to the operating system. (However, system source and change management tools are provided with VM to facilitate local operating system modifications, should they be needed to meet special installation requirements.)

It is difficult to see how the base VM system might be modified to alleviate problems such as those described without impairing or precluding many existing legitimate and productive uses of the operating system in differing environments.

Edson C. Hendricks
Systems Consultant
San Diego, Calif.

Inaccurate picture

Barry L. Abramson's article, "Reducing Security Risks Associated with VM Access" [CW, Dec. 5], presents a profoundly inaccurate picture of VM/SP. Specifically:

- Userids are normally not shared. The problems Abramson claims to solve are caused by users' sharing what should be private resources.
- His scheme for naming files to indicate ownership and to implement control won't work and destroys the benefit of meaningful (user-chosen) file names.
- A number of products (commercial and public domain) are available for manually or automatically backing up data. Abramson seems to have discovered (for himself, the hard way) the benefits of regularly backing up data.
- The CMS command ERASE * * * (printed as ERASE ***) is invalid and is not allowed by CMS.
- The cornerstone of his scheme, CMS EXECs for file protection, is terribly unreliable; an architecture built on EXECs can be defeated by a slightly knowledgeable user.

The article makes two valid points, but offers no solutions. First, sharing files among CMS users is cumbersome (but not for the reasons listed). Abramson fails to mention that many file and library management packages exist that provide controlled and auditable access to files across virtual machine boundaries.

Second, he says that "the responsibility for ensuring system and file security rests with the managers and users of these facilities." But it requires a better understanding of the facilities and weaknesses of the system than he demonstrates.

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VIEWPOINT

U.S. computer industry: 1984

LECHT ON SCIENCE

CHARLES LECHT

In 1984, fantastic changes, some started in 1983, others earlier, will deepen in their effect on our computer industry and cause its evolution to the information services industry to be accelerated. This will occur if for no other reason than 1984's sudden entrance in our industry of a sea of communications companies to compete for marketplace share. The fact that one, AT&T, has the right stuff to capture a lot of it should give our computer industry added incentive for rapid change.

> *"Programming as we know it today will truly start to disappear in 1984. With increased usage of ISDN facilities a certainty, increased investment in their software offerings will occur. These will relieve us from the need to learn artificial lingos like Cobol to get a computer to do our bidding."*

The computer industry events of 1984 will be as diverse as they are exciting. I offer the following in the realms of supercomputers, large mainframes, mid-range computer systems, minicomputers, microcomputers, terminals, telephones and services as representative.

Astonishingly, America's supercomputer industry will complete its withdrawal from our view. Control Data Corp.'s spin-off of Electronic Technology Associates, Sperry Corp.'s strange repudiation of Univac's name, IBM's decision to drop Josephson technologies and then to aid in the formation of Hypres as well as other signals emanating from Cray Research Corp. and from our newly formed Microelectronics Computer Co. all tell us that the really high-powered stuff is headed for silent and unseen development.

Large mainframe business

The large mainframe business will continue to exhibit youthful vitality as companies that need heavy firepower are given increased incentives, including massive discounts, to acquire more and more of it. Price performance improvements will occur so rapidly that we will be confounded in assessing the residual values of things purchased. And each incremental improvement will be substantial enough to warrant our serious consideration of its adoption.

The mid-range computer industry as we know it will begin to vanish. Despite vigorous economic growth, these systems will see their usefulness diminish as stand-alone corporate facilities begin to be replaced by terminals linked to mainframes and/or to our emerging integrated services digital networks (ISDN). The advantages of centralized data processing will be rediscovered, as distributed systems facilities are easily obtainable through ISDN ports.

Our old minicomputer industry will merge with our new microcomputer industry; both will join the smart terminal industry, which will ultimately include the telephone industry. Then all of them — micros, minis, smart terminals and telephones — will slowly begin to metamorphosize into the dumbest terminals possible: idiot-proof boxes requiring as little thinking as we can get away with to perform our most sophisticated chores.

The labeling of terminals as dumb or smart will cease. We will discover that few intelligent people really want to program computers to do things that can be obtained without programming (all other things being equal).

Thus, we can expect our fast-rising sea of programmable devices to be soon engulfed in a swelling ocean of nonprogrammable analogs whose appearance will drastically diminish our need to program anything.

Programming as we know it today will truly start to disappear in 1984. With increased usage of ISDN facilities a certainty, increased investment in their software offerings will occur. These will relieve us from the need to learn artificial lingos like Cobol to get a computer to do our bidding.

Natural-language front ends that place plain old English at our disposal are imminent. No, not the high-class literary stuff (which you're used to reading in my essays, of course), but rather the utterances of businessmen everywhere fumbling and mumbling through their chores and acting in decidedly human and discombobulated ways. Composed of monosyllabic phrase-like grunts whose issuances have a high probability of representing little more than frustration, plain old English is the evolved lingo of jawing businessmen everywhere and even in its inherent inefficiency and ambiguity is preferable to any synthetic language we may devise.

The need to program will also be diminished by yet increased usage of canned applications — especially when we are able to command these to do our bidding with natural-language utterances.

AT&T will increasingly enhance the services it offers while deploying a blizzard of devices to aid users in obtaining them, from telephones to portable personal computers to workstations to on-site corporate computer facilities. At the same time, it will modernize its communications facilities, install cellular mobile systems and announce alternatives to users currently faced with land-based "last-mile" interconnect problems.

IBM will make love, not war, with AT&T. All the *Star Wars* theories will be disproven in 1984. AT&T is IBM's largest customer; in turn, IBM's dependence on AT&T's communications facilities will increase inordinately in the year to come. AT&T, which is buying IBM 3084s as fast as it can, cannot carry off its plans without IBM products. Projected volume and delivery schedules could not be met even if the rest of the computer industry dedicated all its available production to the new AT&T, not to speak of its 22 offspring.

IBM will come out of the closet to become a highly visible telecommunications company offering every conceivable service by year's end. Starting as a reseller of AT&T communications facilities by offering a potpourri of enhancements (the company already uses AT&T lines to deliver its Information Network offerings) and moving on to eventual utilization of Satellite Business Systems facilities, IBM has set its course to become a major force in the telecommunications field.

The American computer and telecommunications industries, through their trade associations, will apply pressure upon our government in order to seek aid in thwarting foreign competition.

Japanese singled out

The Japanese will be singled out, since American electronics companies believe that European competitors are more a threat to themselves than to anyone else. The Communications and Computer Industries Association and its once arch rival, the Computer and Business Equipment Manufacturers Association, will join with the Electronics Industry Association to pool their resources in lobbying the corridors of Capitol Hill to prevent the sale of Japanese electronics in the U.S.

These biased and self-interested groups will unwittingly mount a campaign that can only result in higher

See **INDUSTRY** page 42

Some of my best friends are users

HUMAN CONNECTION

JACK STONE

Although it may sometimes appear otherwise, I have no ingrained prejudice against the user community. If the truth be known, some of my best friends are users.

What has happened, though, is that the expectations of many of the new user set — based on a little knowledge of personal computer operations, enough to be dangerous — have transcended into the systems netherlands, a realm of automation make-believe that resides only in the imagination of unknowing users. Even worse, from such fantasies this ilk has derived ridiculous conclusions about the viability of the computer center organization, in certain cases passing such views on to top executives as gospel. I'll wager a pretty penny that if you wander unannounced into a user's personal computer complex, you'll catch some conversational gems along this drift:

- "Why don't we give each department manager a personal computer to control his unit's operating records and data files? By doing so, we can eliminate a great deal of the hardware in the computer center that, as far as we can see, is doing little more than creating jobs for that department."
- "Personal computers are more powerful, have great flexibility and are cheaper than the systems provided by the data processing organization. We should dismember the DP dinosaur and transfer the analysts into user groups where they can get a taste of the real world."
- "Our central programming staff has been automated out of existence by the generalized file managers installed on our personal computers. No longer do we have to wait in line two years to get the programmers to make some system changes. Now we can reformat our files ourselves and in a matter of a few minutes. Programmers are a dying breed."

Hands-on demonstration

My reflection upon these people is simply expressed in the paraphrase of a biblical thought: The data processing community should forgive them, because they know not of what they do. The thrill accompanying a few elementary computer successes — finding the on/off switch of a personal computer, running a sort task and watching personalized letters pour out on a printer — leads the personal computer user to believe he is a genuine DPer. In fact, relative to the technical challenges in the large-scale computer center the personal computer experience is little more than that of a hands-on demonstration.

What can be done to deflate the wild notions that these novices have about central computer services without losing their trust and confidence altogether? One idea is to let the users proceed on their own, allowing them to learn from their own failures that personal computers, in spite of all their remarkable assets, are, nonetheless, tiny machines.

Of course, they have a role to play, but more and more of the new users are finding that to meet the demands for processing truly large files — and I'm talking in terms of the 500M-byte variety, way in excess of the 10M-byte hard disk capacity that many neophytes believe is the storage penultimate — or for high-speed number crunching, this role is one of a low-cost intelligent terminal interconnected to mainframes. And I'll guess that a good many users who make this discovery quietly phase their personal computers into the closet and negotiate for a decent terminal, determined not to disclose their embarrassment and/or stupidity. ‡

Don't talk down to your users

READER'S PLATFORM

DENNIS LA HOOD

How many times have you felt unappreciated for the extensive time and effort you've put into a project? If you hear anything from your user, it usually revolves around some problem. Almost never do you receive a thank you. How come?

As computer people, we become quite proficient in the skills of our technology. We tend to be creative and have high initiative and above-average intelligence. We demand a lot from ourselves, and our standards are usually pretty high. It is this kind of everyday elitism that also gives us a false sense of our importance. Our true mission is not to be the creators of all good, but to be the facilitators of our users' needs. It is the users' specific needs that result in the requirement for systems to be developed and for our existence. Without the need to build a system, there is no need for the architect. We sometimes lose sight of this. Consider the following:

■ Our first challenge is that of becoming good listeners. The next time you attend a meeting with your users, keep track of the following: How many times do we interrupt the user before they've completed a thought? How many times do we stop listening and start mentally developing a solution? How quickly do we start leading the conversation instead of acting as facilitators?

When we develop systems to our own understanding of the problem, we run the risk that the solution does not meet the user's expectations. Not meeting user expectations guarantees dissatisfaction.

■ Talk up to users, not down to them. It tends to be a normal inclination for DPers to think of themselves as smarter than most users. The fact is that the user is *our* boss, and even when we truly are smarter than our boss, we would never flaunt it. In most cases (if not all), the user knows more about the needs of the organization, and it is these needs that we must understand to attain the successful solution.

The user's knowledge, therefore, is most important to our success. In any learning environment, those that have the knowledge are treated respectfully by those who need to attain that knowledge.

■ Don't promise more than can be delivered.

What's your reaction to an advertisement that suggests a product is a panacea? How do you feel about a salesman's claim that "It'll be totally transparent?" When building user expectations, be careful to limit yourself to deliverables. If each deliverable is an expectation met, then user satisfaction will grow, and mutual respect will be enhanced.

These three basic "to do's," when practiced diligently, will earn the systems development professional the recognition and job satisfaction that the extensive time and effort put into each project deserve. Give them a try.

Measure your recognition before and after. You can always go back to the old ways. But wouldn't it be nice to hear "nice job" just once? ‡

LaHood is director of computer and communications services at Agway, Inc. in Syracuse, N.Y.

INDUSTRY

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user costs, slower technological growth and a lot of hard feelings. I say "unwittingly" because most of their membership has more to fear from a handful of domestic competitors than from Japanese imports.

When not fighting the Japanese, these same groups will work over the Association of Data Processing Services Organizations, Inc. (Adapso), whose leading members are ill prepared to cope. Squeezed between the competition of emerging value-added ISDN facilities and newly emergent data processing service organizations offering banking services from within banks, brokerage services from within brokerage firms and the like, Adapso membership will find 1984 tough sledding.

It's hard to imagine that a Martian landing is high on the list of New Year's resolutions of anyone I know, although conditions for a landing are improved by the close proximity of Mars to Earth in May 1984. So I won't predict the surprise announcement of an Earth-Mars landing party. But it wouldn't be so farfetched if it did occur. What about *Sputnik*'s surprise launch in 1957. Whatever, 1984 will be remembered for the high-tech surprises it will bring and, on balance, I forecast that we'll all be better off because of these. Hang on; Happy New Year.

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

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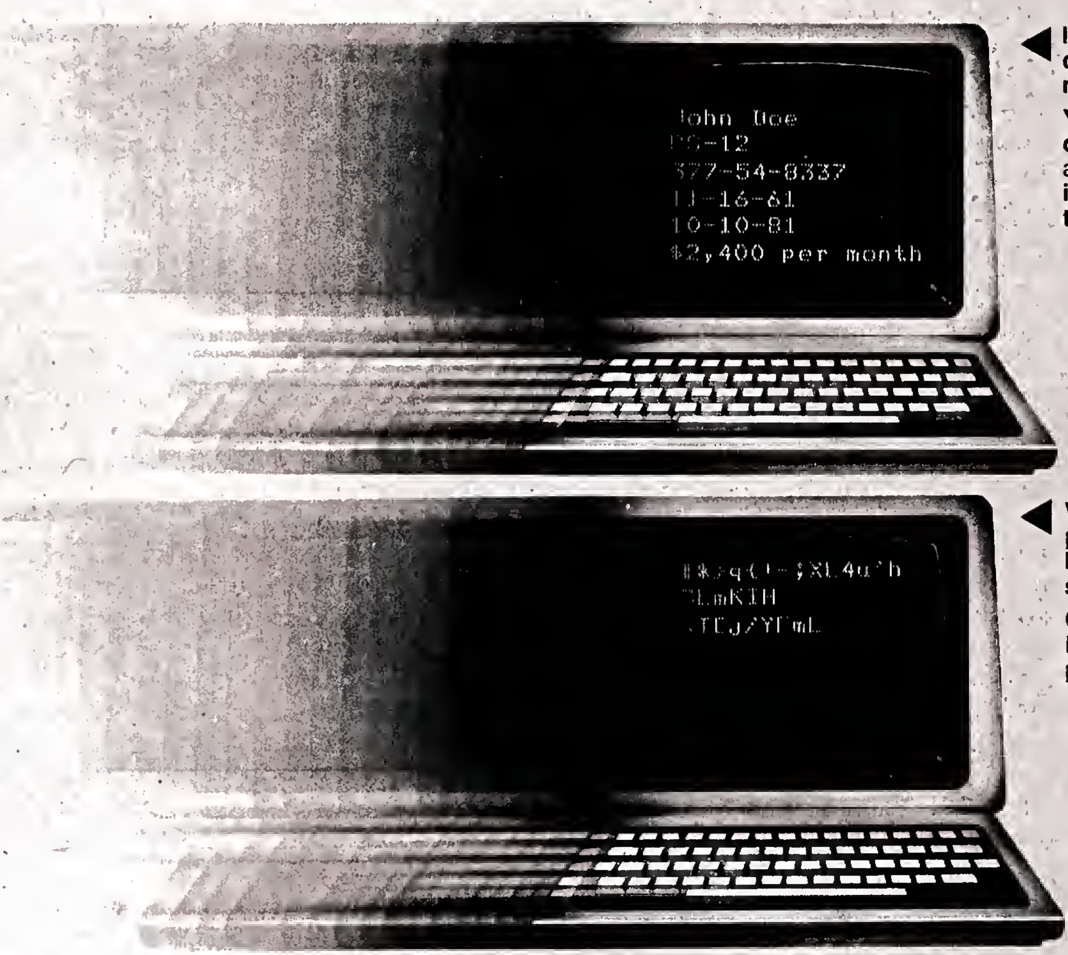

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SOFTWARE & SERVICES

Micro link options growing

By Betty Feezor
Special to CW‡

The personal computer's ability to access information on large mainframes has spawned major developments. In just two years, hardware and software companies have spent millions on micro-to-mainframe development. The confusion surrounding this intensive period of development is now giving way to a market that provides a real choice.

When examining today's micro-mainframe products, you need to consider three major factors: function — what the micro-mainframe product is designed to do; integration; and transfer capability — how the mainframe information is transferred.

Most products provide a method of downloading mainframe information to a personal computer, where micro software packages such as spreadsheets, word processors or graphics systems provide management analysis and reporting.

Integration is also a popular concept of this new transfer technology.A fully integrated micro-mainframe software system provides automatic loading of mainframe data directly into the personal computer's application software. The highest level of integration provides an added degree of flexibility by automatically loading mainframe data into multiple personal computer applications.

Few micro-mainframe products have achieved this level of integration. Most only build a separate file on the personal computer's floppy disk. After the mainframe information is transferred to this special "transfer file," an additional step is required to load the data into an application on the personal computer. True integration allows the user to specify which personal computer application will use the mainframe data. Then, when information transfer is initiated, it is automatically loaded into the personal computer application.

See **JAN9** page 44

UFO/Cobol unveiled for CICS, CMS

HASBROUCK HEIGHTS, N.J. — Oxford Software Corp. has announced UFO/Cobol, an Ansi Cobol-based IBM CICS and CMS application development system.

The product is based on a language consisting of Ansi Cobol statements with natural extensions to run in an on-line environment, a spokesman said.

A pseudoconversational mode of executing on-line programs is provided along with support of all CICS and CMS I/O facilities using standard Ansi Cobol extensions. The product supports calls to standard data base interfaces as well as call subroutines in other languages that conform to CICS or CMS requirements, the spokesman said. An interactive screen painting facility eliminates the need to separately assemble Basic Mapping Support maps. All IBM 3270 screens are treated as ordinary records in a Cobol program. Support of 3270 attributes includes color, highlighting, protection and testing for modified fields.

The Paint facility allows for the free-form design of 3270 screens on-line without code writing. Use of screens is defined, and all CICS or CMS code required to perform on-line transactions is eliminated and replaced with natural Cobol language extensions, the spokesman said. Program execution allows for the pseudoconversational execution of all programs with no preprocessing involved in program compilation.

The CICS/VS version is available immediately. The VM/CMS version will be available in the second quarter of 1984. The price is $24,000 for the IBM DOS version and $33,000 for the OS version. A 25% discount is available through April 1, the vendor said.

Oxford Software, 174 Blvd., Hasbrouck Heights, N.J. 07604.

DBMS for micros called lacking

SOFTALK

PAUL GILLIN

Think about that nice new data base management system (DBMS) you just bought for your microcomputer. Do you really need it? Is it really better than the alternatives? Do you think you will be using it in two or three years?

Jon Nackerud thinks not. The founder and former president of Relational Technology, Inc., which markets Ingres, a relational DBMS, has been keeping a close eye on the micro DBMS market since the products began to proliferate last year.

He is decidedly unimpressed. "Nothing on the market interests me at the time," he said in a recent interview. "It's like a gold rush. Everybody's sold their farm and got their wagon and headed west. They're digging a lot and finding a lot of fool's gold."

Just as spreadsheets were the hot item of the early part of 1983, micro DBMS flourished at the end of the year. Driven in large part by the success of Ashton-Tate's Dbase II (which is now shipping more than 1,000 copies a month) the new entries have sought to capitalize on some of the obvious weaknesses of Dbase, particularly in the areas of ease of use. All but a handful claim a relational structure.

Nackerud called Dbase II "an excellent DBMS," but added that it has spawned a host of imitators and a market direction that is far off course. Micro DBMS vendors are attempting to sell a product without an application, he said. The frenetic quality of the micro software market typically results in a flurry of announcements on the heels of each successful new product, he said. Unfortunately, foresight gets lost in the chaos while market share becomes a vendor's critical considera-

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PRIME

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SDSI

Shared Dataset Integrity, SDSI, solves the inherent data integrity problems caused by the simultaneous access of the same data by more than one system without the use of device 'reserves'. SDSI greatly improves system performance by allowing the user to eliminate device 'reserves' from existing programs without any system or program modifications.

STAM

Shared Tape Allocation Manager, STAM, automatically manages mountable devices, (tape and disk), in multi-CPU installations. Allocation decisions for shared device pools are made automatically, thus eliminating the potential for disastrous operator errors and more effectively using these valuable resources than is possible with manual control.

SCON

Superconsole is designed to provide a single console image for a multi system environment where console messages can be merged together to create a single stream on one or more designated consoles. The result is a more streamline and productive operating environment. Operators will have to monitor only one console instead of many eliminating the need for redundent hardware and personnel.

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Ingres Update Offered

Relational Technology, Inc. has announced Version 1.2 of its Ingres relational data base management system for Digital Equipment Corp. VAX-11 computers under DEC's VMS operating system.

The new version is said to feature improved transaction processing capabilities, better concurrency control, provisions for textual data and enhancements to Ingres/Forms, the company's forms management system.

In complex transactions, "begin/end" commands can be bracketed around any set of updates to preserve the consistency of the data base when records spanning several files are updated as single-user transactions, a spokesman said.

Multiuser concurrency control is improved with page-level locking, and the software will automatically escalate locking to relation level when it is more efficient, the spokesman said. Ingres will also detect deadlocks when they occur and abort one or more transactions in progress.

Ingres/Forms users can create forms with "table fields" that let users view and update several records from a file simultaneously.

Ingres is priced at $40,000 for a VAX 11/750 or 11/780 and $20,000 for a VAX 11/730.

Relational Technology, 2855 Telegraph Ave., Berkeley, Calif. 94705.

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Another element that differentiates the various micro-mainframe offerings is the method of transfer. This determines the amount of mainframe information sent to the personal computer and directly affects how selective the user can be in choosing information to download.

During the early phases of micro-mainframe development, the on-line screen was the standard unit of transfer. The only flexibility in selection was the option to transfer partial contents of an on-line screen, such as columns of budget figures. Despite its limitations, this screen-by-screen transfer has certain advantages. Because the transfer operates independently of the mainframe software, the mainframe system requires no modifications.

However, screen-by-screen transfers are somewhat limited for applications requiring transfer of greater volumes of data. Large-scale financial analysis requires many transfers to assemble a comprehensive report. Nevertheless, screen-by-screen transfer is excellent for bottom-line analysis.

The latest developments in transfer technology offer new solutions to this problem. One approach is file-to-file transfer, which involves selecting part or all of a mainframe file and then transferring the file to the personal computer.

While this is an effective way to download entire files, it also has certain limitations. File-to-file transfer usually requires a special batch job to create the transfer file. As a result, it requires the involvement of DP personnel as well as a time commitment.

If the system is not fully integrated, this method will require an additional selection process and a separate function to load the information manually into the personal computer's application software. File-to-file transfer may also quickly fill up disk space, since large quantities of unwanted data are transferred.

The alternative is a new concept called data base sharing. With data base sharing, each on-line mainframe system is divided and then subdivided into manageable units of information which are actually mini data bases.

DP personnel are not required, and data base sharing is not restricted by file boundaries. Instead, data elements are grouped in logical units that are easily selected and transferred in an on-line environment. Multiple mainframe files may even be accessed and transferred in one request.

Assume, for example, that a manager wants to use the accounts payable system to analyze figures for one regional office. Part of the information resides on a vendor master file, and part of it resides on an invoice file. Both files are so large that a file-to-file transfer to a personal computer is not feasible. Using data base sharing, the manager may select only the vendors and invoices for the particular regional office and then transfer only the selected material directly to the personal computer. If this data base sharing facility is completely integrated, the invoice amounts can be automatically loaded into a spreadsheet micro application at the time of transfer.

The future will bring even more accelerated development in micro-mainframe technology. As major hardware vendors such as IBM provide more sophisticated equipment and mainframe software vendors negotiate agreements with micro vendors, the product offerings are sure to become even more confusing. Future development will center around the data base sharing concept.

Feezor is product manager of Management Science America, Inc.'s Personal Computer Products Division.

DBMS from page 43

tion. "There's not a lot of thought about whether products have a long life," he said.

The root of the problem goes right down to the personal computer user, who is generally ignorant of data processing concepts and couldn't care less about the mechanics of a DBMS, he said.

"A lot of people are buying personal computers out of anxiety. They don't want to be left behind," he said. "I find most of their needs can be filled by using 3- by 5-[in.] cards."

Such users are now bombarded by ads full of DBMS bells and whistles, but offering few ideas of how to use the newly functional data, he said. "Companies are coming out with a $2 million advertising commitment which basically says 'you the consumer are too dumb to know the difference,' " he said. Again, users are buying the DBMS for fear of being left behind.

Nackerud, who left Relational Technology last August, said he is far more impressed by application-specific products that have emerged on the micro. And therein lies the future of micro DBMS. Visicorp's Visicalc and Lotus Development Corp.'s Lotus 1-2-3 are "very good ways to present data," he said.

Nackerud predicts that micro DBMS in their current forms will cease to exist within three years. Instead, the data base will be incorporated into the application with ties to more elegant DBMS on the mainframe.

The market is still open for someone to declare a micro data base standard, one which can be accessed by all applications, he asserted. Distributed data bases will emerge with simple features at the micro level. More sophisticated functions such as backup and recovery, journalization and page locking will be added incrementally at various levels up to the mainframe.

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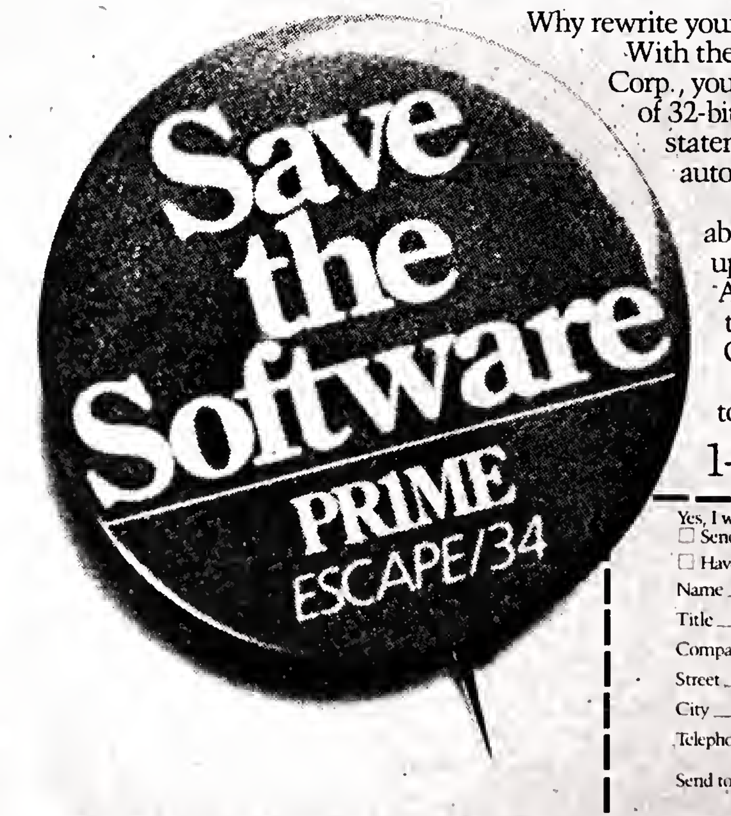

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SYSTEMS SOFTWARE

ADVANCED SYSTEMS CONCEPTS, INC.

Performance Simulation System

Advanced Systems Concepts, Inc. has announced a performance simulation package for the Digital Equipment Corp. VAX-11 series of superminicomputers.

The Performance Simulation System reportedly allows a user to record one or more terminal sessions for the purpose of replaying them under a variety of scenarios.

A company spokesman said the package provides three main facilities: performance testing, application reliability and security.

The package is said to provide a transparent method of capturing one or more terminal I/O sessions. The spokesman said the input log may be edited as required and then replayed through "pseudo" terminals, allowing large terminal and/or transaction loads to be performed while not consuming significant manpower and terminal resources. During playback, the output of the simulated terminal session is captured, enabling comparison of the original output log against the playback output log, according to the spokesman.

The package is immediately available for license fees of $4,995 for the VAX-11/780, $3,495 for the VAX-11/750 and $1,995 for the VAX-11/730.

Advanced Systems Concepts, 22 Hudson Place, Hoboken, N.J. 07030.

SIGNAL TECHNOLOGY, INC.

Quickstar

Signal Technology, Inc. has introduced a set of utility programs for Digital Equipment Corp.'s VAX-11 computer.

Called Quickstar, the set consists of three interrelated programs. The first component, Quickstat, is used for interactive system status monitoring. It reportedly gives managers information on what system resources are being used, and it provides additional selective privileges, the company noted.

Quicktalk, another component of the program set, enables users to communicate between terminals. A user can send a message to any other user or connected terminal with a single command.

Quickchange was reportedly designed to allow users to change from one user name to another without logout and logon steps while retaining recording of accounting messages, changes of defaults and checking of privileges.

Quickstar is priced at $1,700.

Signal Technology, 5951 Encina Road, Goleta, Calif. 93117.

STARTECH SOFTWARE SYSTEMS, INC.

PC/Viewcom

Startech Software Systems, Inc. has announced the PC/Viewcom system, a micro-to-mainframe link that provides for the off-loading of host printing and automatic report distribution.

According to Startech, the system utilizes IBM's CICS teleprocessing monitor and the IBM Personal Computer to route batch reports or online transaction-generated reports to the Personal Computer printer or IBM 3280 or 3260 series printers. It is said to provide full-function mainframe-type spooling facilities such as forward and back spacing printers in the event of a forms jam, report class type queueing, report purging and user report directory displays.

The system reportedly can drive up to three printers simultaneously per Personal Computer, and each device can print different reports from the host.

PC/Viewcom is priced at $2,000.

Startech Software Systems, 2539 Borough Place, Woodside, N.Y. 11377.

BUSINESS SYSTEMS ASSOCIATES

Lasersoft

Business Systems Associates (BSA) has announced a product that is said to allow users of Hewlett-Packard Co.'s HP 3000 to utilize Xerox Corp.'s Xerox 2700 laser

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printer.

BSA's Lasersoft software utility package, combined with an interface controller and the Xerox 2700, enables HP 3000 users to operate the laser printer to merge forms and data from existing reports, a company spokesman said.

The package features Printform, enabling the operator to copy the contents of any form on the laser printer, including data and display enhancements.

A package including Lasersoft, the interface controller and the Xerox 2700 is available for $23,995.

BSA, 20942 Osborne St., Canoga Park, Calif. 91304.

UNIQUE AUTOMATION PRODUCTS, INC.
UAP-Link

Unique Automation Products, Inc. (UAP) has announced the expansion of its UAP-Link file transfer software line to include modules for the IBM VM/CMS and Unix environments.

UAP-Link was reportedly designed to transfer binary or text files among mixed or matched computers. According to the vendor, the package features a layered protocol that corrects line errors and data compression capabilities that increase throughput, and the system requires no conversion programs to reformat text data.

Additional features include single-user control, automatic transfer from dial to logoff, file protection, command files, smart terminal mode and global commands. The release permits the following equipment to be interfaced to the new modules through standard serial ports: the IBM Personal Computer and Personal Computer XT; the Digital Equipment Corp. Rainbow, VT180, RSX-11M, TSX-Plus and RT-11; and the Victor Technologies, Inc. Victor 9000.

The Unix version of UAP-Link is priced at $950, and the VM/CMS version costs $1,500.

UAP, Suite G, 15401 Redhill Ave., Tustin, Calif. 92680.

VIRTUAL MICROSYSTEMS, INC.
P-Bridge

Virtual Microsystems, Inc. has announced the P-Bridge system, which reportedly allows Digital Equipment Corp. PDP-11 and VAX-11 minicomputers to run software written for Softech Microsystems, Inc.'s P-system.

To accommodate four users, the product includes four Zilog, Inc. Z80 microprocessors, 256K bytes of random-access memory and a bit-slice state machine.

The cost of P-Bridge ranges from $5,000 to $7,500, depending on the host CPU, and includes the board, software that allows it to run and a license for the P-system.

Virtual Microsystems, Suite 720, 2150 Shattuck Ave., Berkeley, Calif. 94704.

DIGITAL EQUIPMENT CORP.
Mixed Packages

Digital Equipment Corp. has announced what the company termed "mixed packages" combining Decsystem-10 and Decsystem-20 computers with VAX-11/780 superminicomputers through DEC's Decnet networking software.

In addition, the company announced average price reductions of 20% on Decsystem-10 and Decsystem-20 mainframe systems.

The spokesman said the mainframe/VAX packages are connected through Decnet to interchange data and files. A typical mainframe/VAX combination, according to DEC, is a 1078 package consisting of a Decsystem-1091 mainframe and a VAX-11/780 superminicomputer with associated hardware and peripherals. This package is priced from $499,500 and will be available in late spring of 1984.

DEC said price reductions of mainframe packages and associated software are effective immediately.

DEC, 146 Main St., Maynard, Mass. 01754.

DATAMETRICS SYSTEMS CORP.
Torch/IO

Datametrics Systems Corp. has announced the Torch/IO system, which it described as a measurement tool for Sperry Corp. 1100 se-

Continued on page 49

Our PHAZE P3270 and P9000 product familes are state of the art, feature-superior, modular workstations that operate in the IBM-compatible environment. These products are designed to be added into existing 3270 environments with an ease and value not found elsewhere. They emphasize our commitment to providing the very best in manufacturing, sales and service worldwide. And in every product we build, our corporate commitment to producing the finest machines available is our starting point. Unlike other companies, we aren't striving for quality, *we start with it.*

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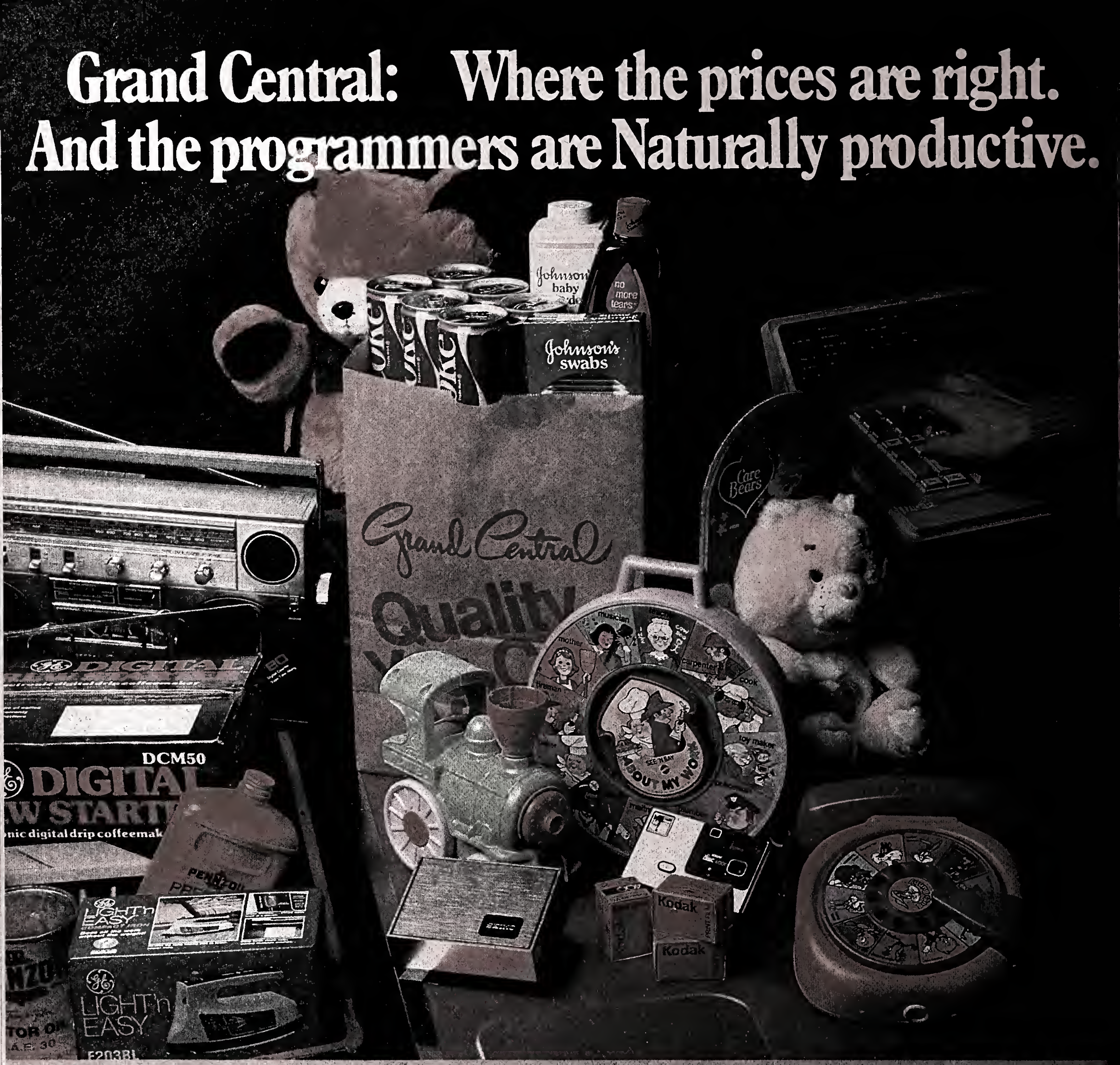

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SOFTWARE AG
OF NORTH AMERICA, INC
Powerful Software Solutions

Continued from page 47

ries processors.

Torch/IO was designed to help operations managers, systems programmers and performance analysts minimize contention for mass storage space. A spokesman said that when many high-use files migrate to a particular device or string of devices, contention for access to that device causes excessive queuing to occur, and I/O service times degrade. Using Torch/IO, the files, file portions and devices experiencing performance degradation can reportedly be identified.

Once identified, files can be reassigned to minimize mass storage contention and reduce I/O service times. Torch/IO can be leased at $4,500 for a single CPU.

Datametrics Systems, Suite 201, 9940 Main St., Fairfax, Va. 22031.

VESOFT, INC.
Security/3000

A security software package for the Hewlett-Packard Co. HP 3000 series CPUs has reportedly been enhanced to limit access to selected subsystems, programs and operating systems commands even after end users have logged on.

With Vesoft, Inc.'s expanded Security/3000 package, access to system modules is reportedly limited through a menu concept in which an account manager creates a file listing all the options that users are authorized to execute. The account manager specifies the file name.

Security/3000 has also been enhanced to allow passwords to be set at any terminal and to monitor and automatically log off display units when they remain idle beyond a preset time limit. The package licenses for $2,400 from the company.

Vesoft, 9213 Warbler Place, Los Angeles, Calif. 90069.

APPLICATION PACKAGES

ARTHUR ANDERSON & Co.
Fin-Pac/38

Arthur Andersen & Co. has announced an accounts receivable system for IBM System/38 computers in companies of varied structures and in varied industries.

Fin-Pac/38 reportedly was developed in RPG-III to utilize interactive and data base facilities of the System/38 for timely and accurate reporting and collection of accounts receivable.

The company said that data entry, validation, posting, file maintenance and inquiry are performed on-line. Other features reportedly allow users to print selectively only those reports needed at a particular time and provide for foreign currency conversions.

The price for the system is $5,000, plus installation, according to the company.

Software Information, Arthur Andersen, 33 W. Monroe St., Chicago, Ill. 60603.

PRIME COMPUTER, INC.
Themis

Prime Computer, Inc. has announced Themis, an interactive logic simulator for digital electronic design.

The product offers mixed mode simulation capabilities, which allow users to model and test at the switch, gate, function or language level, the vendor said.

Themis incorporates features for accurate delay modeling and four-state, three-strength metallic oxide semiconductor circuit simulation, which helps ensure accuracy in large-scale integration or very large-scale integration design, according to the vendor.

The product runs on Prime's 50 series of compatible, 32-bit, virtual memory minicomputers, including the low-end 2250, under the vendor's Primos operating system. It is compatible with the system software available on Primenet and Prime's X.25 standard networking and communications system.

The standard package is priced at $20,000 for the Prime 2250 and $40,000 for all other Series 50 systems.

Prime Computer, Prime Park, Natick, Mass. 01760.

GENERAL ELECTRIC INFORMATION SERVICES CO.
Repmain

General Electric Information Services Co. (Geisco) has announced a software package that is said to provide comprehensive planning and control information for the repair and maintenance of operating facilities.

Dubbed Repmain, the package was designed for use in conjunction with Geisco's Mims system manufacturing package for IBM mainframes in the MVS and VM operating system environments. The vendor said Repmain consists of subsystems that can work separately or together.

The planning and tracking capabilities of Repmain address the primary components of the maintenance process, including spare parts, work orders and purchasing, the vendor said. The system was designed to store and process detailed data for assets and cost centers, and items requiring preventive maintenance on a periodic basis can be entered into the system generating work orders describing the work to be done.

According to the firm, the Repmain system is written in Geisco's

Continued on page 51

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Of course, efficiency is only half the story. ExecuTrieve makes as much sense for the end user as it does for you. Look at it from the other side.

Introducing ExecuTrieve.
From the perspective of the end user. ExecuTrieve is a remarkably simple, but powerful query system.
Easy to learn. ExecuTrieve is a free-format fully on-line system using simple English syntax and requiring no computer sophistication. An editor even allows you to correct errors anywhere in the text.
Quick response. Our proprietary access method means quicker response to even the most complex queries. In fact, the more complex the query, the quicker the response.
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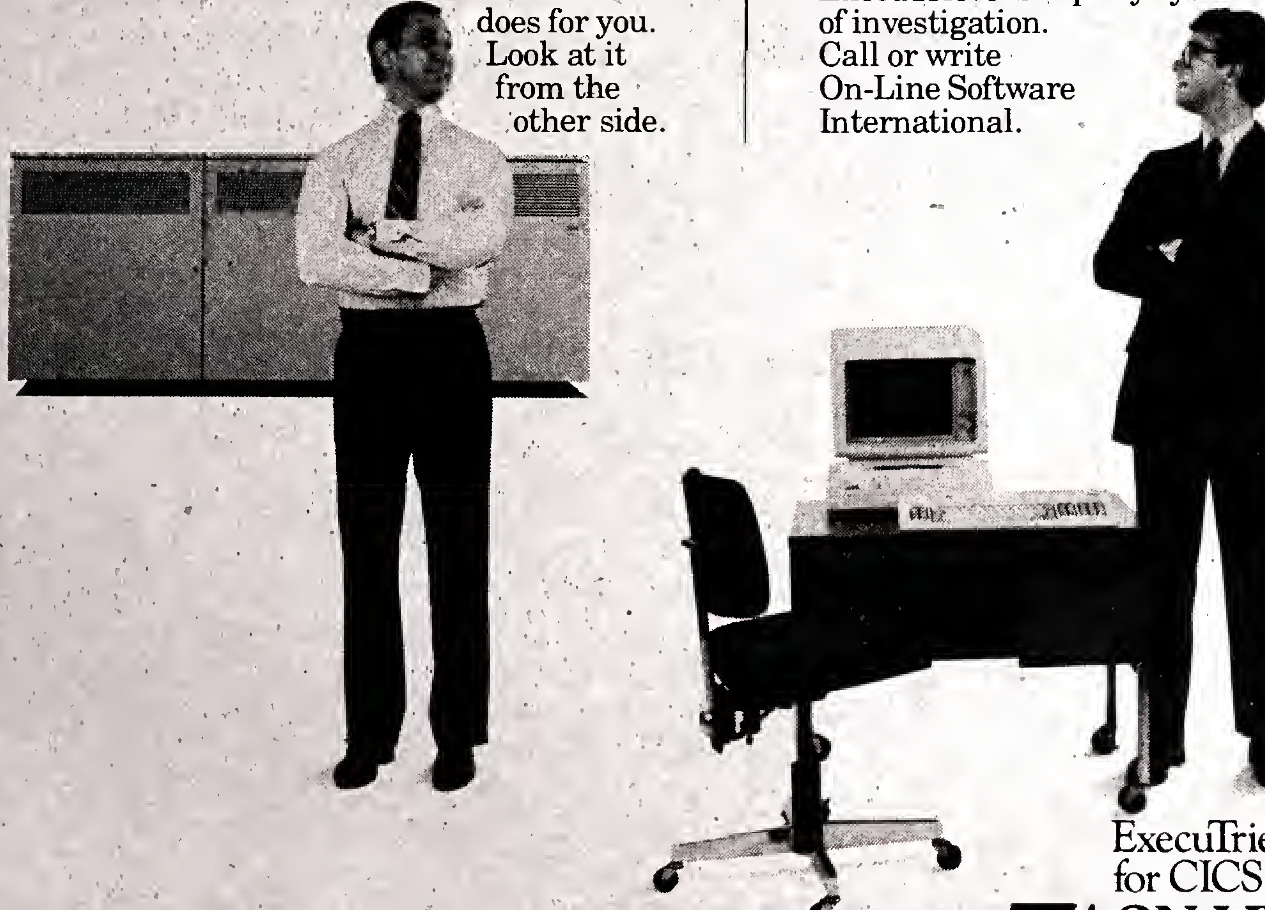

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Frank Chisholm*

*Frank L. Chisholm is Cullinet's Executive Vice President. Frank has worked closely with Cullinet users and prospective users for more than six years. As a key member of Cullinet's management team, Frank has contributed heavily to Cullinet's database product development strategy.

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But suppose when you build a complex, high volume production application with IDMS/R, you desire outstanding performance. Typically, 5% of the data relationships (joins) in any application are accessed 95% of the time. With IDMS/R you can simply change these relationships to predefined joins and benefit from a dramatic boost in performance.

We call it Relational Fastpath. This is what makes IDMS/R a unique relational DBMS, and a perfect system with which to build production applications. In addition, IDMS/R has the most sophisticated back-up and recovery capability of any DBMS, a full integration with personal computers and a complete line of integrated financial and manufacturing applications.

In summary, IDMS/R was designed to satisfy the requirements of the IBM 4300 user who wants to develop both production and end user applications faster and easier.

For further information, attend a Cullinet Seminar. Mail the attached coupon or call the Cullinet Seminar Center at 800-225-9930 (in Massachusetts 617-329-7700).

IDMS/R Seminar Cities and Dates

City & State	Date	City & State	Date	City & State	Date	City & State	Date
Atlanta, GA	Feb. 15	Denver, CO	Feb. 7	New Orleans, LA	Feb. 23	Sacramento, CA	Feb. 21
Arlington Heights, IL	Feb. 23	Des Moines, IA	Feb. 16	New York, NY	Feb. 22	St. Louis, MO	Feb. 8
Austin, TX	Feb. 14	Detroit, MI	Feb. 9	Norfolk, VA	Jan. 18	Salt Lake City, UT	Feb. 21
Baltimore, MD	Feb. 21	Edmonton, AB	Feb. 15	Oklahoma City, OK	Feb. 9	San Diego, CA	Feb. 23
Bloomington, IL	Feb. 21	Greensboro, NC	Jan. 17	Orlando, FL	Feb. 7	San Jose, CA	Feb. 14
Boston/Westwood, MA	Feb. 23	Hartford, CT	Feb. 14	Oshkosh, WI	Feb. 28	Savannah, GA	Feb. 3
Bowling Green, KY	Feb. 1	Indianapolis, IN	Feb. 21	Ottawa, ON	Feb. 1	Seattle, WA	Feb. 7
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Burlington, MA	Feb. 9	Kansas City, MO	Feb. 22	Philadelphia, PA	Feb. 8	South Bend, IN	Feb. 7
Calgary, AB	Jan. 18	Lansing, MI	Feb. 1	Pittsburgh, PA	Feb. 29	Syracuse, NY	Feb. 14
Charleston, WV	Feb. 29	Los Angeles, CA	Feb. 9	Portland, ME	Feb. 21	Tampa, FL	Feb. 8
Charlotte, NC	Feb. 23	Louisville, KY	Feb. 16	Quebec City, PQ	Feb. 15	Toledo, OH	Feb. 24
Cincinnati, OH	Feb. 7	Memphis, TN	Feb. 23	Quincy, IL	Feb. 29	Toronto, ON	Feb. 2
Cleveland, OH	Feb. 3	Miami, FL	Feb. 16	Richmond, VA	Feb. 8	Worcester, MA	Feb. 16
Columbia, SC	Jan. 19	Milwaukee, WI	Jan. 17	Roanoke, VA	Jan. 20	York, PA	Feb. 15
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Continued from page 49

fourth-generation, nonprocedural Mims system language and is said to enable labor requirements to be planned and measured against availability and in planning inventory requirements. The vendor said all information pertinent to key maintenance activities can be clearly monitored and tracked. In addition, detailed costs, including spare parts, labor and overhead, can be tracked to work orders.

For clients currently using the Mims system, Repmain is licensed for $25,000.

Geisco, 401 N. Washington St., Rockville, Md. 20850.

INTERACTIVE SYSTEMS, INC.
Mentor

Interactive Systems, Inc. has announced an on-line data analysis and modeling package for Digital Equipment Corp.'s VAX-11 superminicomputers and Decsystem-10 and Decsystem-20 mainframes.

Called Mentor, the system is said to utilize literal names in addition to the conventional method of numerical row and column access. The vendor said that models developed in several different departments or divisions do not have to be laid out identically because Mentor can perform a consolidation on multiple models that use the same identifiers.

Mentor also features an interactive report writer that permits flexible reporting of data in a model without affecting the integrity of the model itself. According to the vendor, once a report format has been created, it can be saved for future use, and various report formats accessing the same model are also available. The system can store instructions for future use so that a user wishing to perform a task only has to input the correct commands.

Mentor is available at an introductory license fee of $5,000.

Interactive Systems, 131 Middlesex Tnpk., Burlington, Mass. 01803.

HMS COMPUTER SYSTEMS, INC.
AIM/3000 Fixed Asset System;
AIM/3000 Billing System;
AIM/3000 General-Purpose Report Writer

HMS Computer Systems, Inc. has added three products to its AIM/3000 line of financial accounting software for the Hewlett-Packard Co. HP 3000 computer.

The Fixed Asset System provides property control for assets and calculation of depreciation and produces the information necessary to meet governmental reporting requirements, a spokesman said. Assets may be kept active for taxing purposes after they are fully depreciated for book purposes. The purchase price is $7,000.

The Billing System is integrated with the AIM/3000 Accounts Receivable or can be interfaced with an existing system. It has total billing and invoicing capabilities with the ability to restart from any specific invoice. The system accommodates printing of multiple addresses and recurring billings. It is priced at $2,000.

The General-Purpose Writer allows the nontechnical user to generate customized reports in minutes, the spokesman said. It is interfaced with all AIM/3000 systems and includes a preloaded data dictionary. It costs $2,000.

HMS Computer Systems, P.O. Box 35505, Building 9, 4524 E. 67th St., Tulsa, Okla. 74153.

PARA RESEARCH, INC.
Easy Text versions

Para Research, Inc. announced it has enhanced two versions of its Easy Text word processing package: One version runs on IBM's System/34 and System/36, while the second version was designed to be used with the System/38.

The Easy Text for the System/34 or System/36 has an added 30,000-word spelling checker that works in interactive or batch mode.

Enhancements to the System/38 version of Easy Text include automatic line centering, automatic text conversion for 48- and 64-char. printers and paragraph indenting.

The Easy Text is priced at $750 for the System/34 and System/36 and $1,500 for the System/38.

Para Research, 85 Eastern Ave., Gloucester, Mass. 01930.

LANGUAGES

SOFTWARE CONSULTING SERVICES, INC.; BRITISH STANDARDS INSTITUTE
Pascal Validation Suite Quality Control; Standard Pascal Model Implementation

Software Consulting Services, Inc. and the British Standards Institute have jointly announced the Pascal Validation Suite Quality Control package and the Standard Pascal Model Implementation system.

The Pascal Validation Suite (PVS) system consists of 734 test programs that are said to exercise systematically a Pascal compiler to determine its ability to process programs written in International Standards Organization Standard Pascal.

The Standard Pascal Model Implementation (SPMI) is said to be a complete Pascal implementation.

Both PVS and SPMI are available in machine-readable source code for $450 each.

Software Consulting Services, Ben Franklin Technology Center 125, Murray H. Goodman Campus, Lehigh University, Bethlehem, Pa. 18015.

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DATA DESIGN ASSOCIATES

PLUM HALL, INC.
C Programming Workshop; Advanced C Topics; Unix Workshop

Plum Hall, Inc. has announced three five-day introductory courses in the basics of programming in the C language, advanced C topics and programming in Unix.

According to Plum Hall, the seminar materials are available for unlimited internal use through a sublicensing agreement. The C Programming Workshop is an introduction to C for programmers, while the Advanced C Topics seminar covers efficiency, portability and other software engineering topics. The Unix Workshop emphasizes software development.

Internal use of each course is priced at $10,000.

Plum Hall, 1 Spruce Ave., Cardiff, N.J. 08232.

REMOTE COMPUTING SERVICES

CITIBANK
Citiintegrator

Citibank has introduced Citiintegrator, an IBM Personal Computer- and Personal Computer XT-based treasury management system that automates data collection and reporting of bank balance information and serves as a "window" to Citibank's electronic banking and cash management services.

The software is said to provide integration with Lotus Development Corp.'s Lotus 1-2-3 and can link any independent data base using an autodial feature.

Citibank electronic banking services that can be automatically accessed through Citiintegrator include Citicash Manager, Cititreasury Manager and Citibanking.

Citiintegrator's data retrieval and autodialing capability costs $5,000; report consolidation costs $7,500; and target balance consolidation costs $2,500.

Citibank, 399 Park Ave., New York, N.Y. 10043.

ON-LINE DATA BASES

DOW JONES & CO., INC.
Dow Jones Spreadsheet Link

Dow Jones & Co., Inc. has announced a microcomputer-based software product that provides an interface between the Dow Jones News/Retrieval interactive information service and Visicorp's Visicalc, Microsoft, Inc.'s Multiplan and Lotus Development Corp.'s Lotus 1-2-3 spreadsheets running on Apple Computer, Inc. hardware.

The Dow Jones Spreadsheet Link allows users to download data from News/Retrieval into the spreadsheet. A version for the IBM Personal Computer will be available later in the first quarter of 1984.

Dow Jones, P.O. Box 300, Princeton, N.J. 08540.

TRAINING

Data Kinetics Ltd. has announced two training courses focusing on Information Builders, Inc.'s Focus fourth-generation software system.

The courses, Focus Retrieval and Reporting and Focus Programming Workshop, are said to emphasize the user-oriented capabilities of the Focus language. In addition to reporting, the workshop teaches the more complex tools including defining, loading and updating files and data bases, a spokesman said.

It is intended for the experienced programmer interested in building systems. Focus Retrieval and Reporting is said to be a three-day course, and the Focus Programming Workshop is a five-day course.

Reporting course is priced at $4,500, and the Focus Programming Workshop is priced at $6,000.

Data Kinetics, Education Department, 97 Norman St., Ottawa, Ontario, Canada K1S 3K5.

GOAL SYSTEMS INTERNATIONAL, INC.
Design course; Vsam/BC course

Goal Systems International, Inc. has announced two computer-based training (CBT) courses.

The Design course for new CBT authors, project managers or administrators is said to be an introduction to the development and administration of CBT courses.

The six-hour course discusses learning principles and their application to the construction of questions.

Vsam/BC is a four- to seven-hour course that is geared toward system and application programmers in IBM Vsam environments. The course does not cover coding of utilities or requests.

Both Design and Vsam/BC are priced at $3,780 for a permanent license.

Goal Systems International, 5455 N. High St., Columbus, Ohio 43214.

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COMMUNICATIONS

PBX nullifies net predictions

DATA STREAM

JIM BARTIMO

The problem with predictions is that they are always based only on facts existing in the present. So, the futurists of the 1950s predicted space colonies after the launching of *Sputnik* and robots after the advent of the home appliance.

Because these futurists of yesterday had no information on the microprocessor, they could not have predicted the widespread use of computers, communications or even video games.

Similarly, the futurists (read: consultants) of the last three years have been predicting the widespread use of local-area networks. Based on the information available in 1981, predictions that most peripherals and computers would share data over a Xerox Corp. Ethernet or a Wang Laboratories, Inc. Wangnet were justified. Users wanted connections; why not wire devices together?

But things have changed in the last few years. First and foremost, the private branch exchange (PBX) now offers local networks with their new nonblocking architectures. While transmission rates are lower over the twisted pair wiring of the voice world, so is the price.

Not only is the PBX an attractively priced alternative to local-area networks, it is beginning to look as if

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Deregulation may oust vendors

By Lynn Haber
CW Staff

SAN JOSE, Calif. — While deregulation will create significant new revenue opportunities for data communications equipment and services suppliers, the associated disruption will eliminate many vendors, according to a report recently released here.

The report, "Data Communications Markets: Impact of Deregulation," published by Strategic, Inc., projects that the shift of major carriers from universal service to a competitive price-based marketing environment will trigger fundamental problems in the data communications market and cause major headaches for the user community.

Among the negative effects will be a reduction in the quality of switched network transmission. This, in turn, will reduce the revenues that would have otherwise accrued to the independent high-speed switched network modem vendors and force the restructuring of the data communications services submarket into specialized transmission and value-added network segments, as users scramble for reliable services.

"Deregulation will create a healthy market environment for the network management product sector of the data communications equipment submarket," the report said. "This sector, which includes hand-held analog and digital test sets, along with technical control and network management systems, will increase from $472 million in 1984 to over $1.1 billion in 1988, showing an average annual growth rate of 25%."

On the other hand, Strategic pointed out, the associated need for leased services will create additional revenue opportunities for those multiplexer vendors that cater to the needs of the network service suppliers. The inevitable reduction of network reliability will also enhance the sales prospects of test and diagnostic equipment vendors.

The report also projects that new high-volume semiconductor technology, rapid progress in fiber optics, excess satellite capacity and the economics of digital transmission will combine to stimulate the introduction of a broad range of alternative methods of data transmission.

Strategic's report discusses the major influences that will drive this market for the rest of the decade and warns of potential problems that may affect corporate strategy. The report costs $1,500.

Strategic, P.O. Box 9747, San Jose, Calif. 95157.

INSIDE

- OS and DOS users can communicate with any device supporting IBM 2780 and 3780 protocols/**55**
- Computers with IEEE-488 interfaces can communicate with RS-232 through a microprocessor-based interface/**55**
- PCI debuts Ascii-to-IBM converters/**55**
- Local network supporting multiple operating systems now available/**55**
- The fourth-generation PBX and the user/**57**

Digital's DR Soft/Net links micros

A software package that can reportedly link microcomputers running its CP/M operating system via any local-area network was announced here by Digital Research, Inc.

Introducing its new DR Soft/Net package, the company claimed the product enables offices to tie together diverse personal computer workstations using local-area networks such as Xerox Corp.'s Ethernet, Datapoint Corp.'s Arcnet and Corvus Systems Inc.'s Omninet.

The package is said to interconnect micros running any version of Digital's CP/M, CP/M 86 and Concurrent CP/M operating systems.

Networking features reportedly include file sharing, password protection and record and file locking. In conjunction with Concurrent CP/M, DR Soft/Net is said to provide a file-server capability at each workstation. According to the vendor, users are able to share files and transfer information while

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TUTORIAL

Communications manager to emerge from automation

By Charan S. Lohara
Special to CW‡

With the communication of information fast becoming the most essential function of the automated corporate office, the emerging new breed called the communications manager must be a key decision maker in a company's information management process.

The rapidly changing business world demands that voluminous amounts of mostly computer-generated data be delivered quickly and in usable form to many levels of decision makers and specialists throughout an organization.

Communications, however, costs enormous amounts of time and money, which means that — for corporate survival — the escalating costs of processing information must be reduced. Also, the growing library of company-developed software must eventually be networked for optimum efficiency.

Many companies still believe that a well-tuned office automation capability can address these issues because of the manager's familiarity with in-house computer systems and the word and data processing needs of all company functions.

What top management does not realize is that virtually all information management is now a communications matter and can no longer be the exclusive province of the data processing, information system or office automation manager. The communications manager — who is the only one with an overview of every department's communications needs — has to be involved in the decision-making process from the beginning.

Ideally, of course, the office automation manager should incorporate communications into his sphere of expertise, and the communications manager should be knowledgeable about office automation. Even more ideally, their two departments should merge into one. At the very least, however, both should work together for cost-effective results, with each implementing critical assigned functions.

For instance, just as a company's traffic manager (not the senior accountant) decides on the most cost-effective way of shipping a product, the communications manager (not the office automation manager) should be the one to choose the appropriate method of transporting information.

Communications technologies are now at a developmental level comparable to where data processing was 15 years ago and are moving forward rapidly. Data processing tends to accommodate mainly traditional business practices and is not likely to advance beyond that stage unless there is a major shift in the way companies operate.

The advent of affordable data communications systems brought about by inexpensive microprocessors has significantly influenced the rise of communications technology. What is being done today in this area was not possible just two or three years ago, because certain integrated chips were not available.

As an example, the function of a modem the telephone company currently rents for about $75 per month can now be performed by a chip that costs only about $30 to buy.

Choosing the technology for transporting information requires strategic planning, and this logically falls within the scope of the communications manager. In this capacity, he can reduce office automation's work load by selecting office equipment that not only has communications capabilities, but can take over some of the processing load at remote workstations. Any excess loads on the central DP computer can then be shifted to the office automation side of the house or to the communications processor.

In addition to his role in office automation, the communications manager should play a vital part in a company's networking, which is

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PBX

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it could be the hub of the automated office.

Second, IBM has yet to give local-area networks its blessing by releasing a product in this field. Although hinted at time and again, IBM's entry into this market seems less and less likely.

Big Blue seems content to stick to its Systems Network Architecture (SNA) method of connectivity with last year's introduction of the 3270 Personal Computer. IBM has not ignored the PBX network either, by investing heavily in Rolm Corp.

The final blow to local-area networks may be the high-flying predictions of the futurists. The gap between hype and reality has weakened the confidence of the data manager to invest too heavily in a technology stuck at the starting gate. When no one will invest in a technology, prices stay high, and when prices stay high, no one will invest.

But perhaps another new development, such as telecommuting, will make host-based networks the darling of the communications industy once more. Perhaps users were just waiting for the recession to subside before investing heavily in communications equipment.

There are many reasons to believe the local-area network is not dead — but the same could be said of the space station and the robot.

MANAGER

from page 53

becoming more critical and complex as demand for information continues to increase.

Again, because of his overall view of an organization and its local, regional, national and global operations, the communications manager is in the best position to apply cost-effective concepts and technology to the equipment and services required to solve business communications problems now.

The communications manager is also the one who will be ready with the right solutions 10 years from now. Communications is, after all, a long-term proposition, and today's communications manager must place more emphasis on planning than on the actual operations of communications.

The communications manager cannot afford to indulge in short-term solutions, except as they fit into the context of a more comprehensive strategic plan.

A long-term plan would allow corporations to buy three units now instead of committing to 20, because the next five units scheduled for purchase would provide more advanced technology and, probably, more capability.

Corporations, particularly those that are watching expenditures (and which ones are not?) are beginning to realize that the communications manager is in a position to save them millions of dollars — not just in direct costs, but also through more efficient office operations and equipment planning.

If communications is coming of age, so must the communications manager.

Lohara is chairman and president of Intelligent Communications Networks, Inc., Ventura, Calif.

LINK

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running an application.

DR Soft/Net does not require dedicating a separate workstation CPU to supervise networking, Digital claimed, and its multitasking capabilities also support transferring data between local and remote processors via a local network, thereby providing full distributed processing.

The product will be sold for $1,000. Digital Research also announced a new compiler design, the first example of which, a compiler for Fortran-77, will be released in January, the company said.

The Fortran-77 compiler, priced at $500, will be the first of five new compilers to use the technology and will run on Concurrent CP/M and CP/M-86 operating systems.

Digital Research, 160 Central Ave., Pacific Grove, Calif. 93950.

Science Dynamics offers ACT-LTBR

Science Dynamics Corp. has announced the ACT line trunk billing recorder (LTBR) a microprocessor-controlled terminal that records accesses to telephone operating company equipment.

The product may be used with both electromechanical and stored-program controlled telephone company switching systems. The unit includes 24 electronic meters for each input to record the number of inbound and outbound accesses and their duration for each rate period — day, evening and night, according to the vendor.

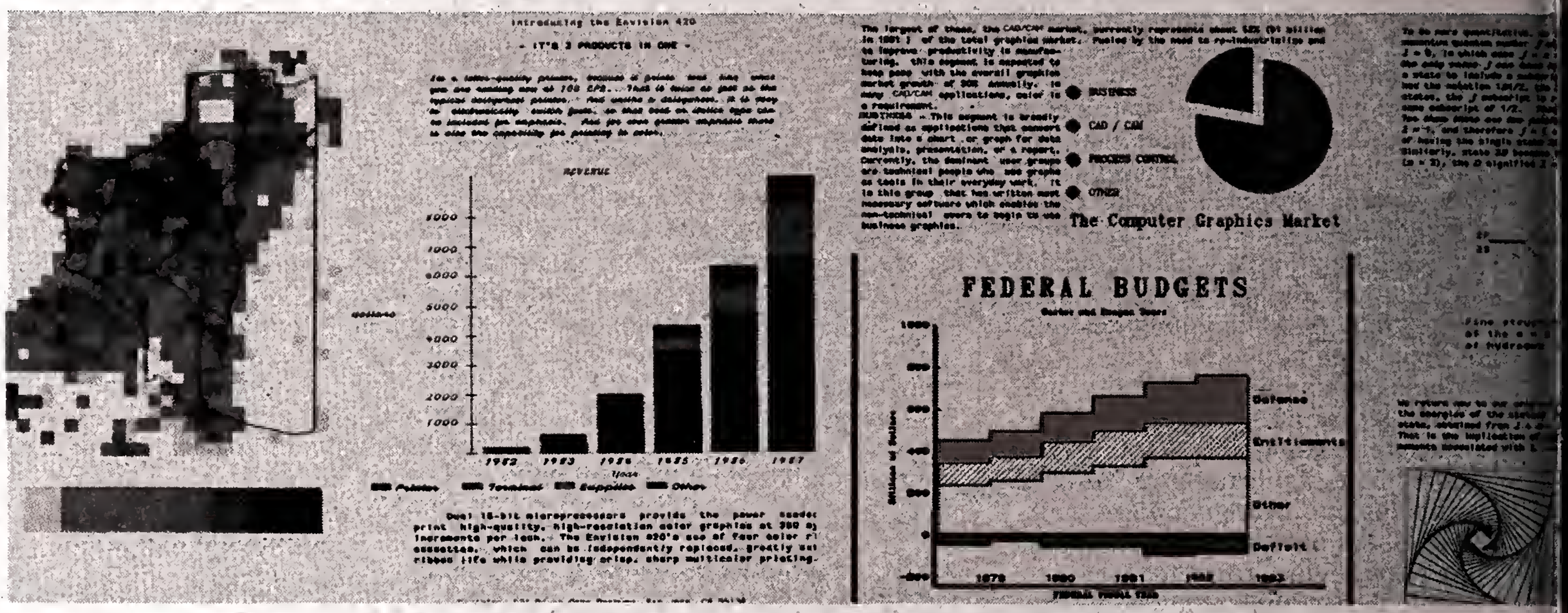
The ACT-LTBR terminal includes a built-in control panel for programming trunk and line parameters to suit each installation.

Each input is individually programmable to accommodate various types of loop, ground start or electrical and mechanical signaling, or units may also be programmed from a central site, according to the vendor.

Other terminal features include security code protection, battery-protected memory, a perpetual calendar and modular construction, the vendor said.

A basic ACT-LTBR to accommodate 16 lines or trunks is priced at $3,150.

Science Dynamics, 1919 Springdale Road, Cherry Hill, N.J. 08003.



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Even if you're not a Van Gogh, our new 430 gives you the ability to create inspired color graphics. It prints any four colors of red, green, blue, cyan, magenta, yellow or black in a single pass. You can also blend any of these colors to create an entire spectrum.

And because a one-eighth inch solid color band is printed on each pass of the 18-wire printing head, our 430 creates your masterpieces with incredible speed.

UNCOMMON VECTOR/RASTER GRAPHICS

We made our 430 compatible with the Hewlett Packard 7220 pen plotter. That means it's supported by a host of business, engineering, and scientific graphics software packages. And it gives you printed quality that's nothing short of superb. As well it should. Because we designed our 430 with exceptionally accurate horizontal and vertical registration. It also prints raster graphics at 360x144 dots per inch for the highest resolution or 72x72 dots per inch for maximum speed. And to give you added flexibility, we gave our 430 the ability to print on plain paper *and transparencies*.

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When you begin using our 430 you'll quickly discover you don't have to be a wordsmith to create letter quality documents with punch. Any of the character fonts can be mixed or colored using host computer control.

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And our 430 comes with optional letter-quality character fonts like **BOLD**, *italic*, *SCRIPT* and ORATOR. Plus you

COMMUNICATIONS

PROTOCOL CONVERTERS

CONNECTICUT MICROCOMPUTER, INC.
Busster GR

Connecticut Microcomputer, Inc. has announced a microprocessor-based interface designed to allow computers with IEEE-488 interfaces to communicate with devices that have standard RS-232 interfaces.

The Busster GR is said to facilitate connections between processors and printers, modems, terminals, mainframes and other computers.

Programmed through Basic commands from the host IEEE-488 computer, Busster GR reportedly features selectable bit/sec rates from 75 to 19.2K, 110-char. input buffer and parity and word-length selection.

The unit, currently available, costs $495 for a standard version.

Connecticut Microcomputer, 36 Del Mar Drive, Brookfield, Conn. 06804.

PROTOCOL COMPUTERS, INC.
PCI 176

Protocol Computers Inc. (PCI) has announced the immediate availability of its new Series 100 protocol converters which, the vendor claimed, enables Ascii terminals to communicate with IBM hosts.

The Series 100 includes four models:

- PCI 176, which supports up to seven personal computers and/or Ascii terminals and printers, according to the vendor.
- PCI 167, which, the vendor said, allows IBM 3767 users to substitute Ascii terminals, printers, teletype terminals, graphics plotters and micros for IBM Systems Network Architecture (SNA) devices.
- PCI 151, which reportedly allows non-IBM Ascii terminals and printers to be linked to IBM's System/34, 36 and 38 computers.
- PCI 171, which provides Ascii to bisynchronous conversion for non-SNA IBM applications, according to the vendor.

Pricing for the PCI 171 and 176 starts at $1,850 and at $2,850 for the PCI 151 and 167.

Protocol Computers, 6150 Canoga Ave., Woodland Hills, Calif. 91367.

COMMUNICATIONS SOFTWARE

SOFTWARE DEVELOPMENT AND MAINTENANCE, INC.
SDM3780

Software Development and Maintenance, Inc. (SDM) has announced a communications software product that is said to enable IBM users with OS and DOS operating systems to transfer data to any other computer, terminal or remote entry device that supports 2780 and 3780 communications protocols.

Known as SDM3780, the software system emulates a remote job entry workstation for the IBM subsystems JES and Power. Also, SDM3780 can support file-to-file transfer as either the host or the terminal, using any combination of hardware and/or software subsystems it supports, SDM said. SDM3780 runs under any IBM DOS/VSE, OS/VS1 or MVS operating system. Communications are performed via IBM 2780 and 3780 Binary Synchronous Communications protocols using Vtam.

SDM3780 is priced at $4,500 for the DOS version and $5,000 for the OS version.

SDM, P.O. Box 668, 134 Spring Ave., Fuquay-Varina, N.C. 27526.

LOCAL-AREA NETWORKS

KANTEK, INC.
Kannet

Kantek, Inc. has announced Kannet, a local-area network that can support up to 254 computers of dissimilar types with several different operating systems.

According to the company, fully transparent format translations make it appear to each computer that all other computers are the same type it is. The operating systems supported by the Kannet system include Microsoft, Inc.'s MS-DOS, IBM's PC-DOS and Digital Research, Inc.'s CP/M 86 and CP/M 80. All operating systems may reside on the network concurrently, Kantek noted.

The Kannet system is priced at $1,295 for each computer in the network.

Kantek, Suite J, 1370 N.E. 20th, Bellevue, Wash. 98005.

AUXILIARY EQUIPMENT

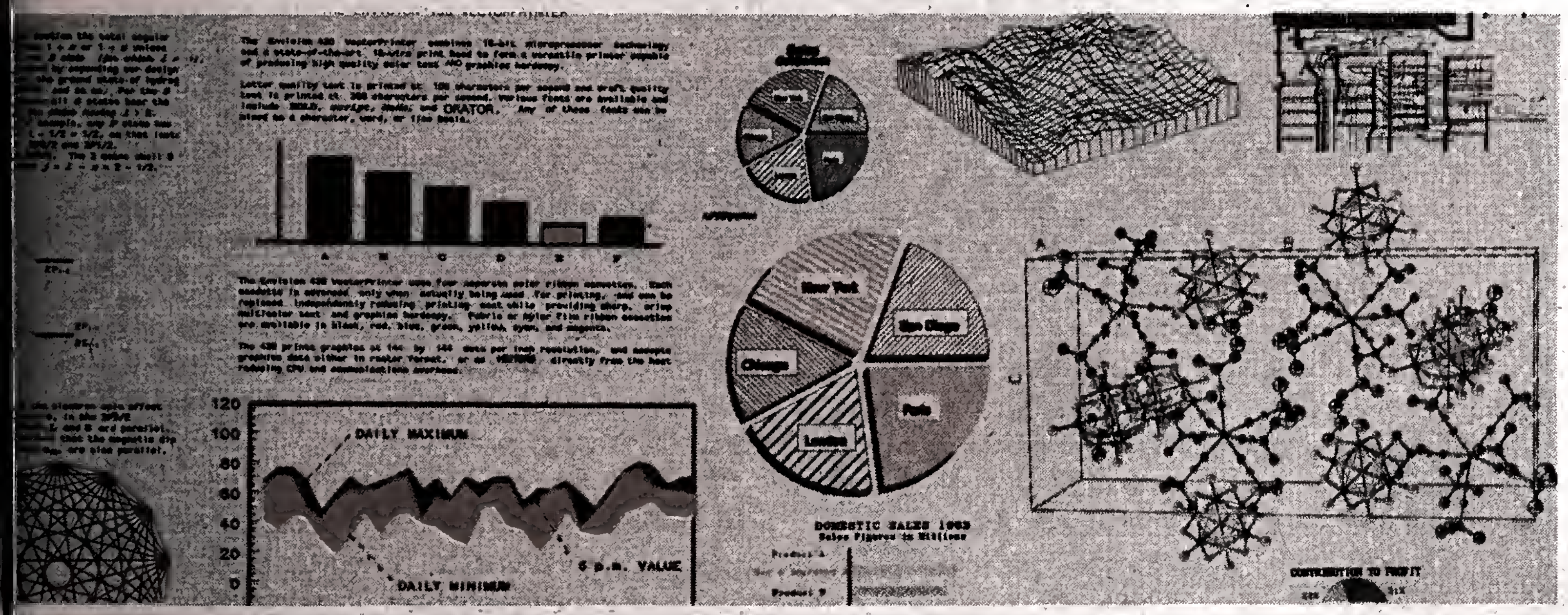
COMMUNICATIONS PUBLISHING GROUP, INC.
"Fiber Optics Coupler & Connector Patents"; "Fiber Optics Fiber & Cable Patents"

Communications Publishing Group, Inc. has published two reports concerning fiber-optic patent activity from 1963 to 1983: "Fiber Optics Coupler & Connector Patents" and "Fiber Optics Fiber & Cable Patents."

The reports contain fiber-optic patent numbers, descriptions of each patent, reproductions of selected patents and names of whomever was assigned a patent.

The reports cost $125 each.

Communications Publishing Group, P.O. Box 383, Dedham, Mass. 02026.



can define up to 196 characters to print both text and graphics. And to add versatility to your text creations we made our 430 compatible with the **Diablo 630 ECS.** Which means it supports the most popular text and word processing packages.

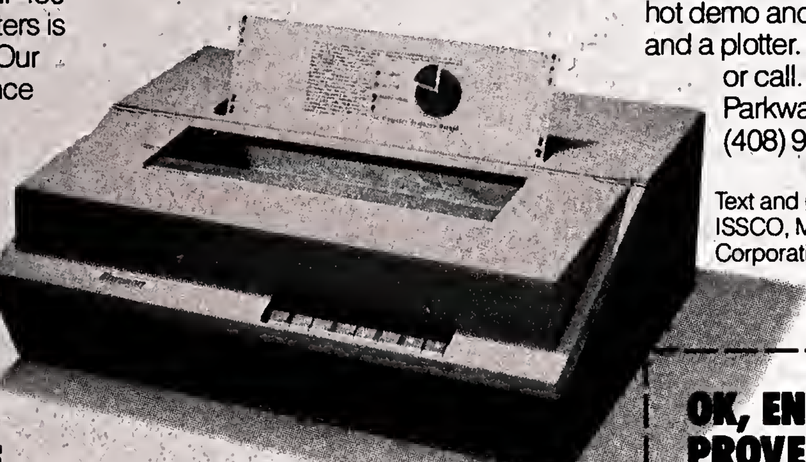
NO MORE RIBBON WASTE

Another nice little benefit of our 430 you won't find in other color printers is a four-cartridge ribbon system. Our separate color cartridges advance independently as each color is used. By doing things this way you don't end up wasting ribbon or running out of the color you want just when you want it. It also means lower cost per copy for you. Plus you also have a choice of high quality mylar ribbon cartridges and longer life nylon ribbon.

YOU DON'T HAVE TO PASS UP SPEED FOR QUALITY

Our 430 has been designed with an 18-wire printing head. This means that instead of having to pass over a line more than once to achieve high quality, our 430 prints letter quality characters in a single pass. It also does this with a great deal more speed because it never has to retrace the same line.

And while we're talking about speed, you should know we built our 430 with a print control microprocessor which tracks the carriage through a unique closed-loop servo system and adjusts for carriage speed and direction during dot placement. That permits it to print *while* the carriage accelerates. Which is another reason it gets your job done a lot faster.



THE 430's UNFORGETTABLY EFFICIENT

If you tear down our 430 you'll find two 16-bit microprocessors. One of them controls the printing mechanism; the other takes care of the host interface and command interpretation.

They both share a 128K-byte bit-map memory. So while you're busily telling the 430 what to print next—it's busily printing what you told it to print last.

A RED HOT DEMO

We think you'll be impressed when you see our 430. But that's not enough to get you to pick up your telephone and call. So if we can't prove it's more than a color printer, we'll give you a 430. Free.

Show a little sporting interest and take us up on our offer. You'll get a red hot demo and a chance to buy a printer and a plotter. Send us the coupon or call. Envision, 631 River Oaks Parkway, San Jose, CA 95134, (408) 946-9755 or Telex: 176437.

Text and graphics samples courtesy of: ISSCO, Megatek, Molecular Structure Corporation, and Precision Visuals, Inc.

OK, ENVISION... PROVE IT TO ME. PLEASE CONTACT ME REGARDING A DEMO.

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Envision

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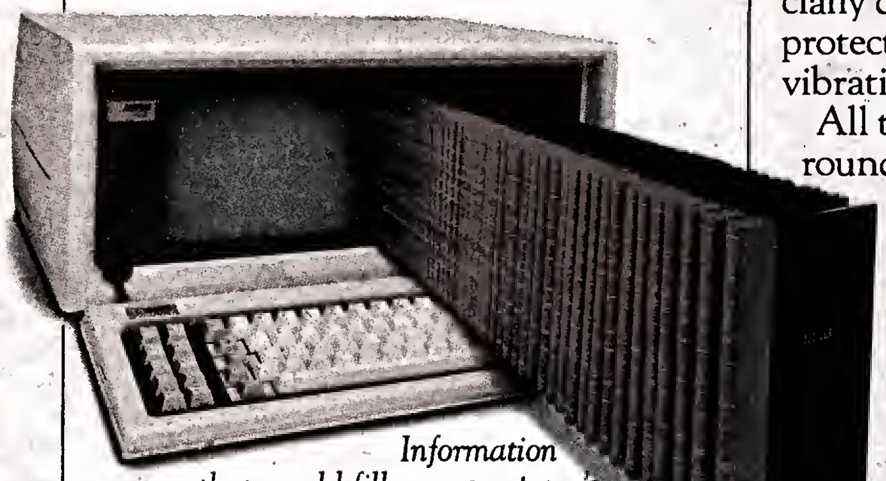

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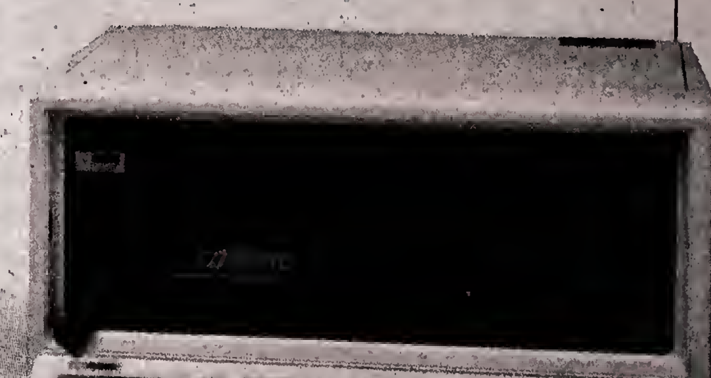

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Newest PBXs to provide exclusive service

By Neil Weber
Special to CW‡

When hand-held digital calculators first hit the market, they were marvels of miniaturization and electronic design. They were also very expensive. But for people who needed that level of computational power, they were the only game in town. Then, only months later, similar or even more sophisticated models were flooding the market at vastly lower prices.

Today, users and potential users of digital telephone-switching systems are about to face this dilemma. "Fourth-generation" private branch exchanges (PBX) are now on the drawing boards of several manufacturers, replete with sophisticated enhancements that sound utterly fantastic. In the near future, a number of these new systems will be brought to market.

Like the digital calculators, these new PBXs will at first be relatively expensive, and, for a time, they will have their share of bugs.

Predictably, most companies will follow the classic pattern of waiting to buy only when the product is attractively priced and thoroughly proven. However, those few companies that do "take the plunge" will gain an exclusive period of valuable service from these new switches.

The fourth-generation PBX will incorporate all of the current capabilities and will provide vastly greater data transmission capacity and speed-along, as well as a host of "convenience" features.

But even more important, the new PBXs will integrate voice and data transmission capabilities into a single device. Thus the stage will be set for the PBX to act as a complete protocol and format translator, capable of linking virtually any two computers. In effect, then, the new generation of PBXs will soon open the door to data bases anywhere in the world, regardless of the computers involved.

At the present time, a company that requires a great deal of data transmission through its PBX system must employ a separate data switch, which generally costs between $100,000 and $200,000. With the fourth-generation PBXs, however, no additional data switches or expensive external modems will be required.

Hence, the quandary of companies in search of a state-of-the-art PBX. In making their decision to buy or to wait, these companies will need to consider a number of factors.

Companies employing a moderate number of lines (200-600) and a comparatively low volume of transmitted data should be especially careful in projecting their future requirements before investing in a fourth-generation system. It may be a long time before such a company can utilize all of the features available with today's systems, much less those of fourth-generation systems.

The capability to handle data traffic better is in most cases the prime rationale for acquiring a fourth-generation system. Thus, companies that do not have extensive data transmission requirements will do well to question the need for such an advanced PBX.

Furthermore, these companies will take comfort in the proven reliability of third-generation systems. As the product of several years of design experience, third-generation PBXs are virtually free of problems associated with voice transmission.

Fourth-generation systems, however — designed "from scratch," so to speak — will require a period of time before they offer a comparable level of reliability in the realm of data transmission.

Neil Weber is director of Product Marketing at Harris Corp.'s Digital Telephone Systems Division.

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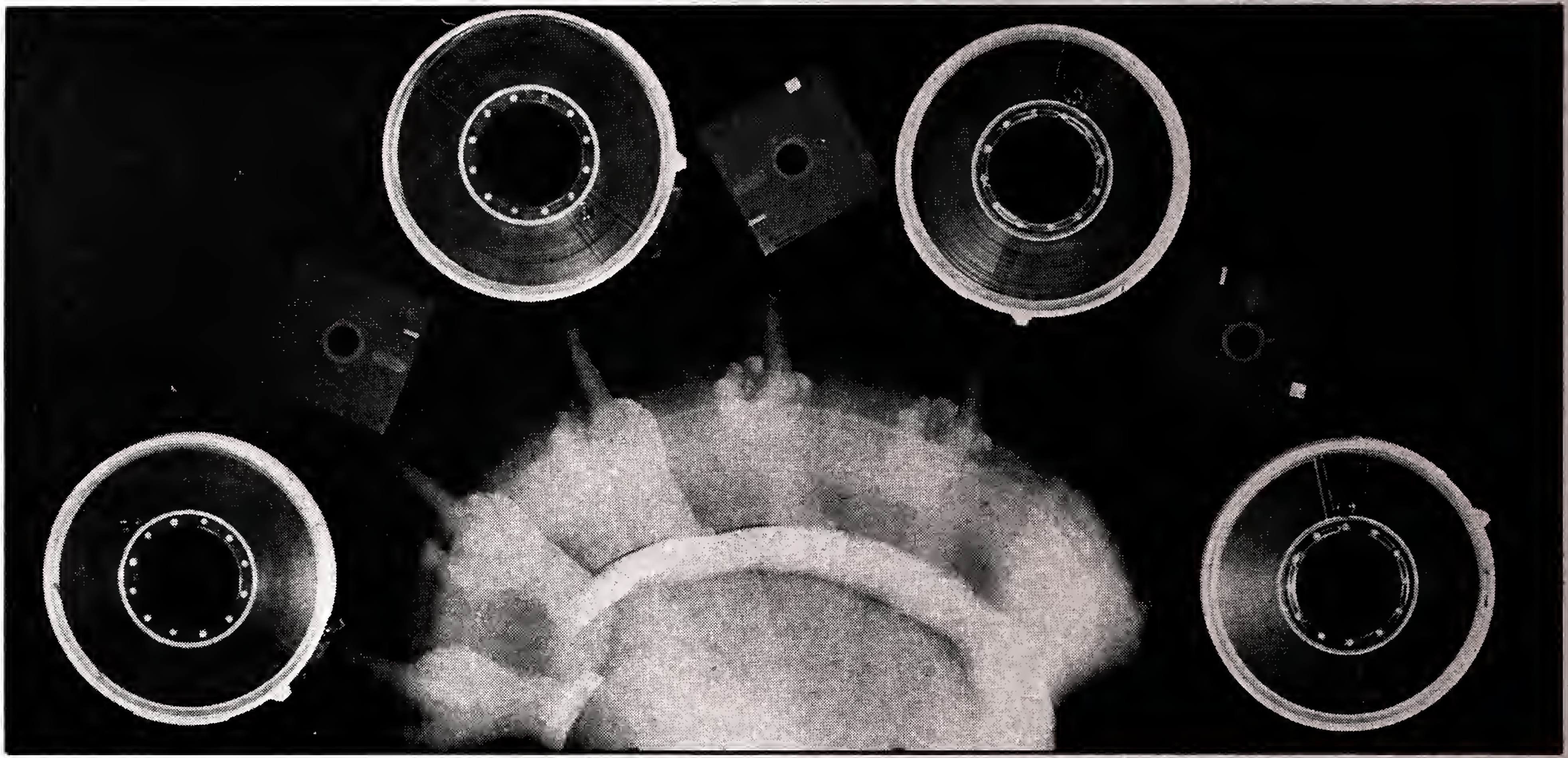

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1. BUSINESS/INDUSTRY (Circle One)
End Users
- **10** Manufacturer (other than computer)
- **20** Finance/Insurance/Real Estate
- **30** Medicine/Law/Education
- **40** Wholesale/Retail Trade
- **50** Business Service (except DP)
- **60** Government—State/Federal/Local
- **65** Public Utility/Communication Systems/Transportation
- **70** Mining/Construction/Petroleum/Refining
- **75** Other User______

Vendors
- **80** Manufacturer of Computers, Computer-related Systems or Peripherals
- **85** Computer Service Bureau/Software/Planning/Consulting
- **90** Computer/Peripheral Dealer/Distributor/Retailer
- **95** Other Vendor______

2. OCCUPATION/FUNCTION (Circle One)
- **11** President/Owner/Partner/General Manager
- **12** VP/Assistant VP
- **13** Treasurer/Controller/Financial Officer
- **21** Director/Manager/Supervisor DP/MIS Services
- **22** Director/Manager of Operations/Planning/Administrative Services
- **23** Systems Manager/Systems Analyst
- **31** Manager/Supervisor Programming
- **32** Programmer/Methods Analyst
- **35** OA/WP Director/Manager/Supervisor
- **38** Data Comm Network/Systems Mgmt
- **41** Engr/Scientific/R&D/Tech Mgmt
- **51** Mfg Sales Reps/Sales/Marketing Mgmt
- **60** Consulting Mgmt
- **70** Medical/Legal/Accounting Mgmt
- **80** Educator/Journalist/Librarian/Student
- **90** Other______

3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as user, vendor or consultant
- **A.** Mainframes/Superminis
- **B.** Minicomputers/Small Business Computers
- **C.** Microcomputers/Desktops
- **D.** Communications Systems
- **E.** Office Automation Systems

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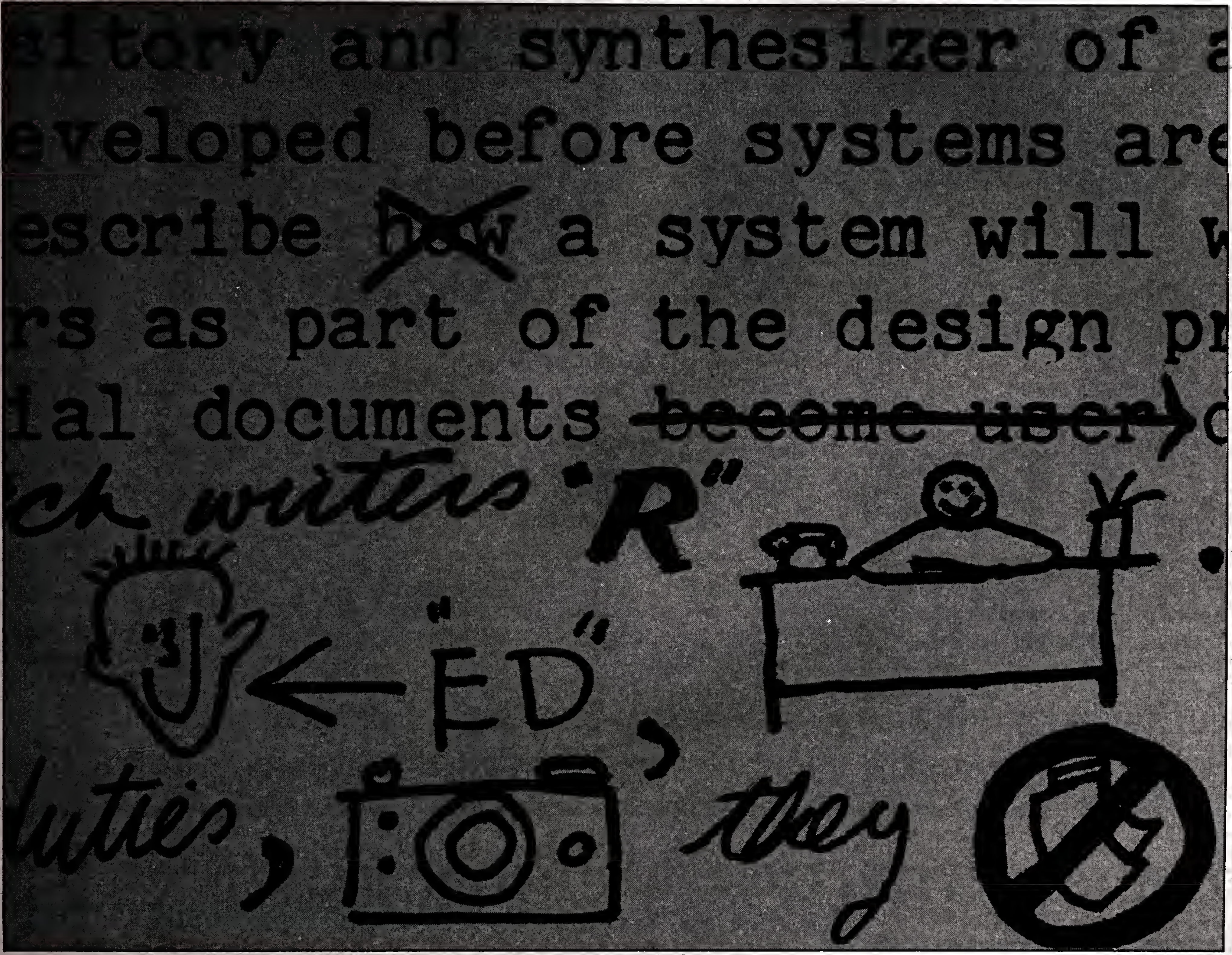
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The rise of the technical writer

The technical writer is, at least in some systems departments, an equal member of the development team. Projects are now more user-driven, demanding an effective liaison between user and technician — namely, the technical writer.

By Gene Knauer

In the rush to develop systems that meet the immediate or imminent needs of a management information systems environment, documentation often receives low priority. And traditionally, technical writers have lagged behind systems and user staff in both salary and status.

But the picture has changed significantly in recent years and continues to brighten. With greater acceptance of documentation as an important element of systems development, pay and responsibilities for writers are growing.

In a typical development situation, the programmer builds a system along linear patterns of logic. He usually jots down notes about a system in the order that his ideas come. These notes rarely constitute concise system documentation but can form an initial draft.

Enter the technical writer. From amidst the twists and turns, contradictions and omissions of the programmer's notes, the tech writer must synthesize and extract a clean, clear set of user instructions for the new computer system. The writer seeks to uncover the hidden logic in a program and then to convert it into a hierarchical pattern, with a main function at the top and subfunctions below.

"The writer is always seeking," says John Urton, a technical documentation consultant at the Federal Home Loan Bank in San Francisco. "He's always asking, 'What's this? Why isn't this working? Let me see that.' Once the system is designed, people want him to go away."

Technical writers in most MIS environments are usually activated about the time that new systems design and implementation staff are moving on to other projects. Friction often results from the technician's lack of interest in a system that is already history to him. The questions tech writers ask about the system to be documented force the programmer/

Armed with new knowledge about systems technology and the development process, the user expects more from documentation, based on his experience with manuals from popular micro packages. Dry technical prose isn't acceptable anymore. Graphics, tutorials, flowcharts, on-line help screens and quick reference cards are part of the new generation of documentation tools.

analysts to rehash old work.

"Often," says Lois Pryor, co-owner of Echols & Pryor Technical Communications in Berkeley, Calif., "the questions are seen by the systems staff as intrusions on their thought processes, which are now focused on equally complex and challenging new systems." When the tech writer uncovers mistakes or weaknesses in a system that reflect badly on its authors, friction between the two groups may turn into open hostility.

Pryor's partner, Carla Echols, remembers when "tech writers were traditionally the people who did the typing in the offices in Silicon Valley. They had the status of clerks." This situation contributed to the friction.

But changes in the development environment are now promoting greater harmony in the workplace. Among the improvements is a growing overlap in the responsibilities of systems staff and writers.

A variety of schemes for organizing documentation efforts, subspecialties within tech-writing ranks and a burgeoning tech-writer consulting market now exist.

Environmental portraits

At MIS environment A, tech writers are regarded as editors. Given specifications by the systems staff, their charge is merely to edit rather than extensively rewrite.

At environment B, tech writers are equal members of systems development teams. Using a homegrown methodology, the tech writer helps monitor the project and serves as the repository and synthesizer of all information. Documentation is developed before systems, in some cases, are ever designed. Drafts of these early documents, which describe how a system will work or should work, are circulated among programmers as part of the design process. Eventually, revised versions of these initial documents become user documentation.

At environment C, no tech writers are employed. Since the users are technically oriented, they don't need documentation simplified to the normal level of nontechnical user friendliness. The shop's systems analysts, in addition to their other duties, develop all necessary documentation.

Several changes in the MIS environment are creating a trend toward option B, where the systems staff and technical writer are peers working together closely through the development process.

Change number one is the growing decentralization of data processing environments. Projects are now more user-driven. The technical writer, along with the applications/business analyst, is one of the prime liaisons between user and technician. Translating technical details to readable, concise instructions, the tech writer acts as the user vangard, the interpreter of a foreign language to business English.

"The user is getting more sophisticated," says writer Mary Ann Tharaldsen of Wells Fargo Bank in San Francisco. "He can do a little programming and understand the programmer better than before." Users have come to realize that systems are an important adjunct to the business environment, an adjunct they must control and understand and demystify.

Change number two is the emergence of hundreds of thousands of user computerphiles into the world of data processing through the microcomputer revolution. Armed with new knowledge about systems technology and the development process, the user expects more from documentation, based on his experience with manuals from popular micro packages. Dry technical prose isn't acceptable anymore. Graphics, tutorials, flowcharts, on-line help screens and quick reference cards are part of the new generation of documentation tools. They are

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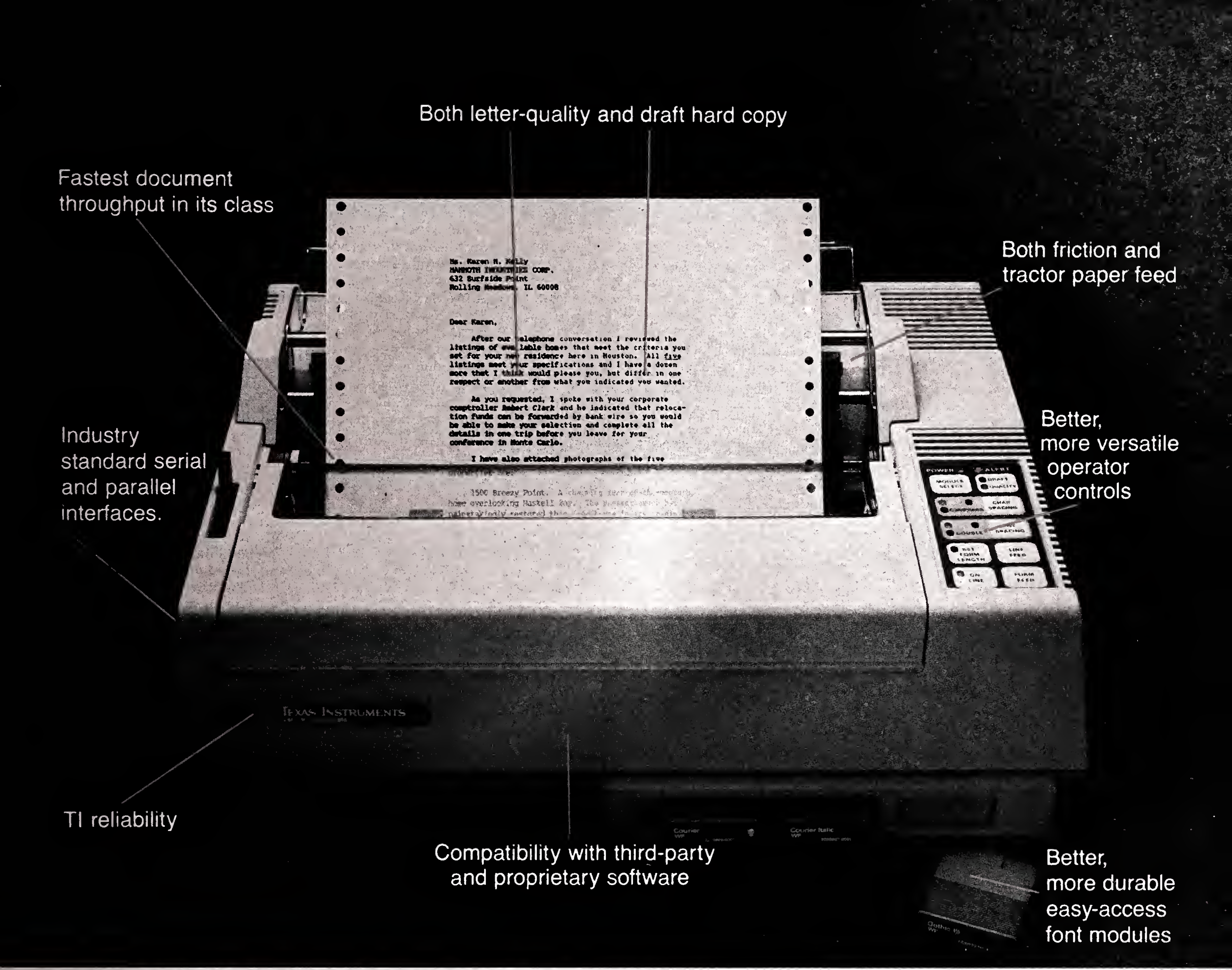
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On-line documentation

On-line documentation is a growing phenomenon. The costs for production and lack of flexibility of hard copy along with the cost for quick and frequent updating are two of the major reasons.

In one DP environment, user acceptance of on-line documentation was monitored closely. The results showed a strong trend in favor of the new approach. When the on-line screens were first introduced, the ratio of printed lines of documentation to viewed lines was 115 to 1. Within a year, that figure dropped to 45 to 1.

Changes in documentation can be written and released on-line in the same day. Special user interface programs are also becoming a part of the on-line documentation environment. Programs are available that adapt to the user's level of knowledge. The programs prompt the user to give enough information in the query to direct him to the proper section of documentation.

If the user is experienced and knows exactly what section of documentation to search for, a short query, properly worded, is sufficient.

Value of graphics

Whatever one's language skills, visuals are one of the most effective methods of conveying information. Consultant John Urton uses IBM's Script software as an aid in formatting and editing. "It helps me with information mapping, breaking down documentation into concepts and processes and procedures and generally smaller untis."

Urton uses graphics enthusiastically and sets up sophisticated referencing through tabs and color coding. "Often all you need is the outline of a procedure, says writer trainer Carla Echols. "The graphic representation can be much more effective than prose." Echols claims writers are starting to do more flowcharting and less writing.

Logisticon, a systems house in the Silicon Valley, went a step beyond simple graphics for its documentation. It hired a cartoonist. Technical writer Dierdre Morgan worked with the artist to develop a manual that is entirely cartoons for a modular microcomputer-based warehousing and distribution package. Capitalizing on the use of flowcharts, diagrams and basic English, Morgan tailored the manual to speak simply and concisely to truck drivers working in warehouses, transporting merchandise from delivery docks to storage.

Artificial intelligence

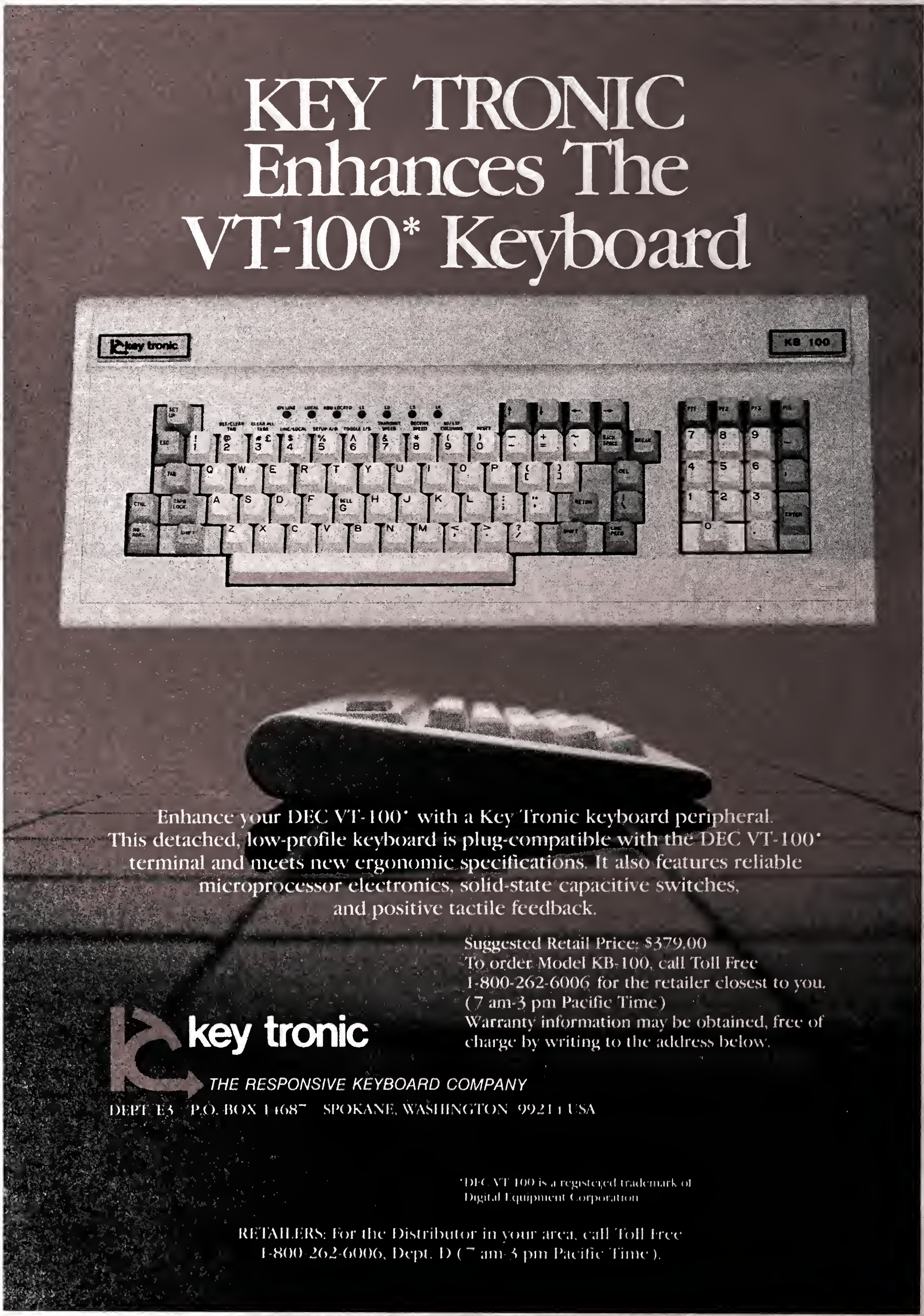
Even experimental "knowledge information processing" expert systems have affected the world of DP documentation. At the National Magnetic Fusion Energy Computer Center in Livermore, Calif., consultants are working on a sophisticated user interface for on-line documentation.

The center serves the country's magnetic fusion community — physicists and engineers at universities and corporations. But the documentation department confronts most of the same problems as its peers in financial MIS environments: interpreting and answering user queries, amending and implementing changes in documentation, extrapolating the hidden logic and functional sequence of a system from a technician's notes.

A team of consultants at the center is working on an experimental program that takes a user's on-line query, looks for terms in the question that might be key words in the documentation in question and then displays those passages of the documentation in which the key words appear. If there are no key words in the query, the program a) prompts the user to paraphrase the question until key words are produced or b) routes the query to a consultant's terminal at the center. In this case, the user would receive an answer or a referral to a specific passage of documentation, unaware that a human being was on the other end of the communications link.

Micro workstations

Other MIS environments are experimenting with using microcomputers as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People Express, one of America's fastest-growing airlines, chose an NCR 8600 series computer system to handle online reservations. NCR is a leader in online transaction processing equipment, communications and system software.

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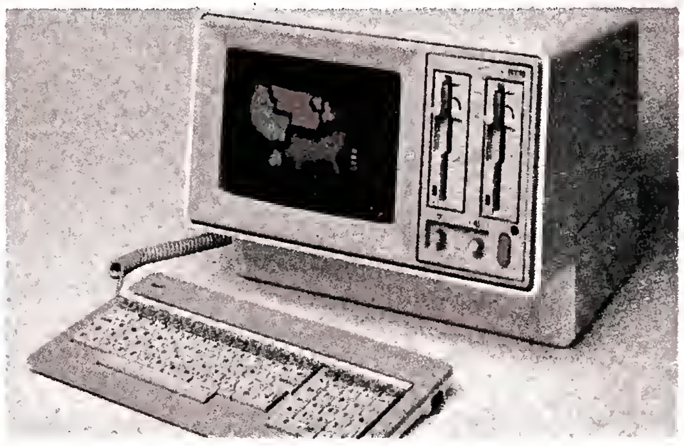

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The NCR 9300, a roomful of computer power in a 50-pound box, was a big breakthrough in 1983. Add this 32-bit VLSI mainframe for a complete system price of less than $46,000!

workstations for tech writers. Lead Documentation Editor T.R. Girill of the Livermore center is managing the development of such a system. "We're experimenting with a program that automatically splits the editing tasks between the micro and the mainframe. Global changes affecting the entire document are handled on the mainframe. Smaller, single-line or word changes take place on the micro."

According to Girill, the main file the writer is working on resides on the mainframe. Little pieces of the file are shipped, as needed, to the micro, a handy feature when editing among the 16,000 pages of on-line documentation that the center produces.

Another type of expert system the Livermore center is experimenting with involves the concept of a decision tree. According to Girill, the system is another type of query response mechanism that accesses a general subject or portion of documentation and then leads the user down a "tree" with alternatives, until the problem or user query is fully defined. The system ends by routing the user to that part of the documentation that answers the question.

Writing subspecialties

Evidence of the emergence of technical writing as a data processing specialty is in the proliferation of writing subspecialties and in the consulting positions they have spawned.

Documentation has established itself as one of the best liaisons between the technical and user worlds. As more users enter the world of data processing, their introduction to systems will be greatly influenced by the quality of systems documentation.

There are now methods analysts (who specialize in putting together standards and procedures manuals), indexers (they anticipate under what names a user might seek a bit of information in a manual, then set up the indexing and cross references), hardware and marketing and operations writers, to name just a few.

For the writer with several years of experience and an interest in consulting, rates currently range between $20 and $50 per hour. Hardware documentation, usually requiring an engineering or electrical background, may bring hourly consulting rates of $75 or more for qualified professionals. But the duration of consulting assignments for the tech writer is usually much shorter than for systems analysts and programmers.

This difference may account for the steady attrition from within documentation ranks. More money and greater responsibility lure tech writers to programming, analysis and management at rates of 50% to 75%, according to one recent survey.

At a salary in the range between $15,000 and $35,000, a technical writer can take his chances as a consultant (usually as an independent or subcontractor) or become an analyst, a technician or a manager.

Clearly, documentation has established itself as one of the best liaisons between the technical and user worlds. As more users enter the world of data processing, their introduction to systems will be greatly influenced by the quality of systems documentation. The clear-thinking, pragmatic, diplomatic and hard-working technical writer of today can look forward to a future with multiple opportunities within MIS.

About the Author

Gene Knauer is marketing representative and seminar director for Knauer Computer Consulting in San Francisco, Los Angeles and Honolulu. He writes freelance articles for a variety of computer publications.

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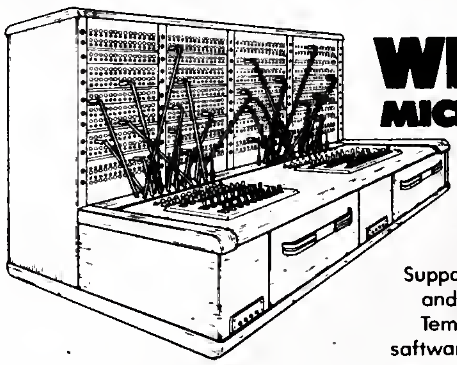

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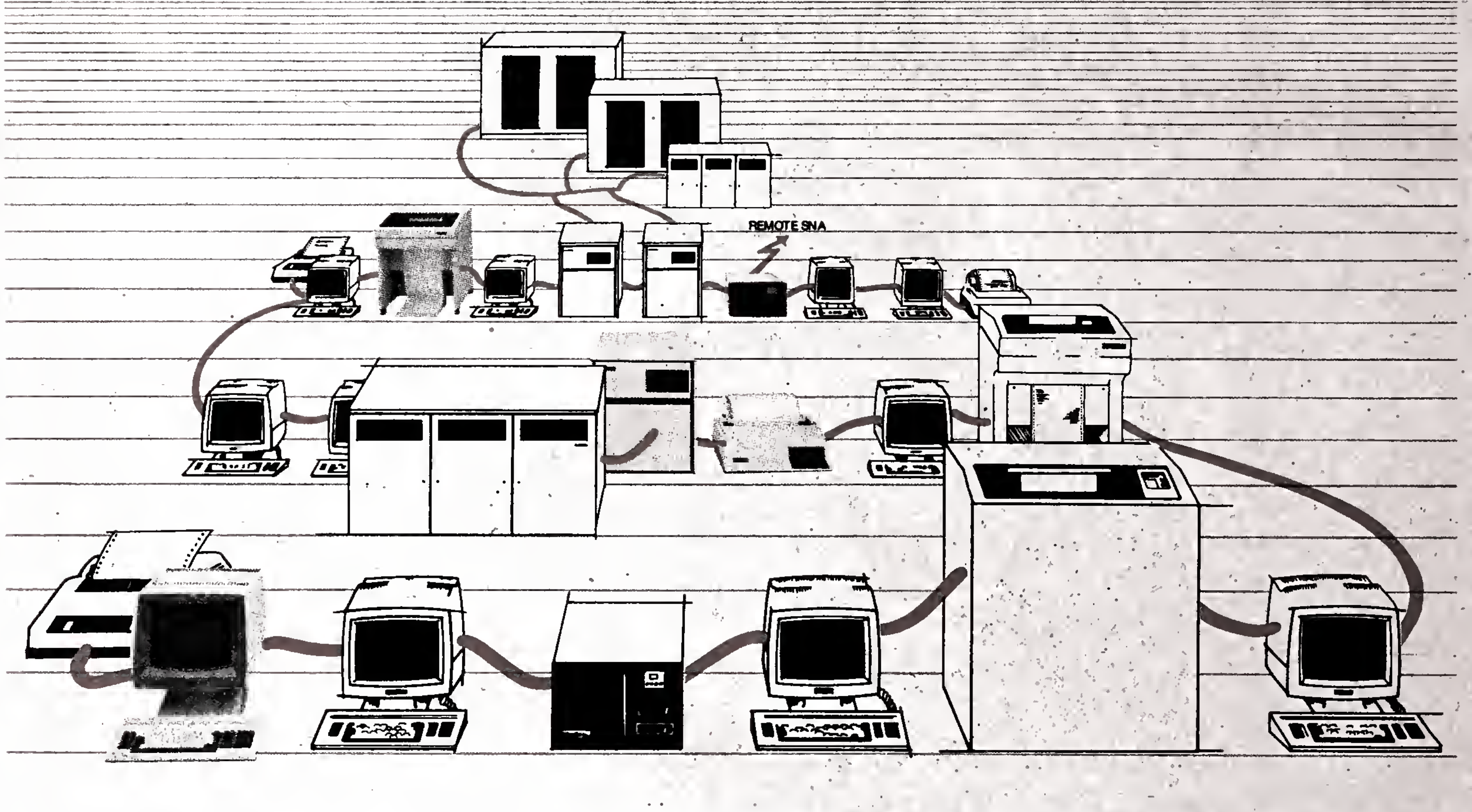

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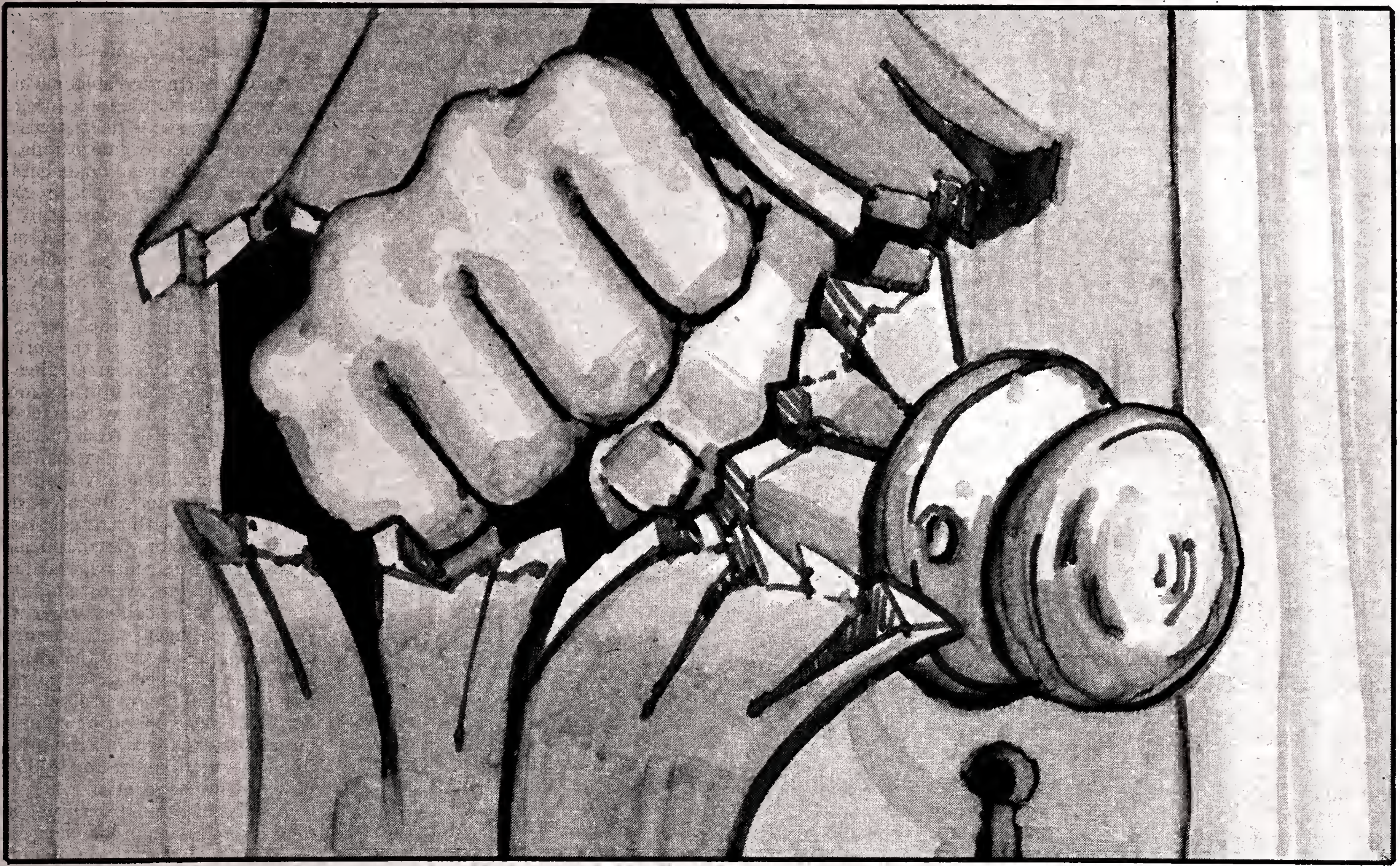

Illustration by Kristie VanValkinburgh

Information systems — the power in your hands

By David G. Robinson

Businesses are coming to view their information systems as strategic weapons. With maturing products, intense overseas rivalry and increasingly fragmented and specialized markets, information systems can be powerful competitive tools when applied aggressively at the right time and in the right place.

Information systems are being used to strengthen communications with customers, analyze market trends and drive down operating costs by streamlining manufacturing and distribution facilities. While these applications sound familiar, the difference in the 1980s is the way in which companies are focusing their information systems efforts on those areas of the business that will yield the greatest competitive benefit.

Logically, this direction should result in new and challenging opportunities for the information systems organization. At last, the information systems function is putting its "beast in the basement" status behind it and becoming a real partner in managing the business.

Unfortunately, accomplishing this task is far from easy. Because of the way strategic systems operate within the business, traditional organizational structures and business/information systems relationships act as an impediment to the pursuit of strategic systems.

Supporting business changes

Business and information systems managers must first understand that information systems do not produce any strategic value at all. The systems themselves are, in fact, intrinsically worthless. The value that accrues from the use of information systems is a function of *business changes* that the systems support, not a function of the systems themselves.

Most strategic business moves involve some sort of change: in business process, in culture, in managerial approaches or in the marketplace. It is the strategic changes developed by management to respond to perceived opportunities or

Information systems cannot be strategic by themselves. They must be linked to corporate strategic thinking and become a vital part of the fundamental business changes which that thinking produces.

known competitive threats that are the source of value when information systems are used strategically. Information systems operate to facilitate or make possible these fundamental strategic business changes.

Consider the following example. A large division of a manufacturing company determined that its inventory levels were excessively high, especially in its extensive distribution network. Corporate management had decided that working capital levels supporting the business had to be reduced or the business could not be maintained and would be considered as a candidate for divestiture. One of the major efforts management had initiated to combat this problem was an improved distribution system. Unfortunately, it was not until well into the systems effort that the fundamental *business* problem was identified: The company had adopted a customer service standard that resulted in excessive inventory levels.

This basic business assumption had to be reviewed along with the other logistics and product movement processes that had been considered part of the system. The inventory problem became solvable only when the company began to rethink its entire distribution philosophy and adopted comprehensive alterations in its approach to servicing customers. After the problem had been reconsidered, the nature of the new distribution system also changed, and much of the original design work had to be scrapped.

> *For the past decade, information systems organizations have been taught, often painfully, that the key to success is to "serve the user." In reality, what the user wants is frequently inconsistent with the strategic direction of the corporation, especially in times of strategic change.*

The lesson here is that information systems cannot be strategic in and of themselves; they must be linked to a body of strategic thinking and be vital to the fundamental changes which that thinking produces.

Insiders or outsiders?

Many information systems managers would like to play a leading role in furthering strategic systems thinking in their organizations. For those who are already members of the senior management team, this desire is relatively easy to fulfill. Many other information systems managers are considered members of upper-level management as defined by their organizations, but they are often excluded from the "inside" discussions that surround the formulation of new business strategies.

In addition, most information systems organizations are managed to respond to requests from the operating level of the organization. This structure fundamentally limits the information systems department's ability to deal with strategic issues in the corporation. Communications between strategic managers and operating managers are often imperfect, especially at those times when strategic management is attempting to change the views of the bulk of operating managers in the corporation as part of a new strategic thrust. Yet these same operating managers largely determine what the information systems organization will provide for the corporation.

As a result, the information systems organization is commonly out of touch with strategic thinking in the company. Even when communication between information systems and the business is good, the former is still one step removed from strategic thinking. For the past decade, information systems organizations have been taught, often painfully, that the key to success is to "serve the user." In reality, what the user wants is frequently inconsistent with the strategic direction of the corporation, especially during times of strategic change.

Among our clients, we have seen the dilemma of the information systems manager lead to several undesirable results. First, we frequently encounter large, expensive and risky business efforts which, while responsive to the "bottom-up" requirements of the organization, are inconsistent with the "top-down" strategic view of the business. Second, because these tactical systems requests vastly outnumber strategic opportunities, the strategic systems opportunities are frequently lost in the shuffle.

Third, because operating managers are not usually positioned either to develop ideas for strategic change or to have the authority and responsibility to implement them, they are unable to work with the information systems organization to plan for strategic systems without the substantial involvement and backing of top management. That support is frequently lacking.

Finally, because this set of structures frequently results in the wrong systems being built, substantial amounts of information systems resources are being misapplied.

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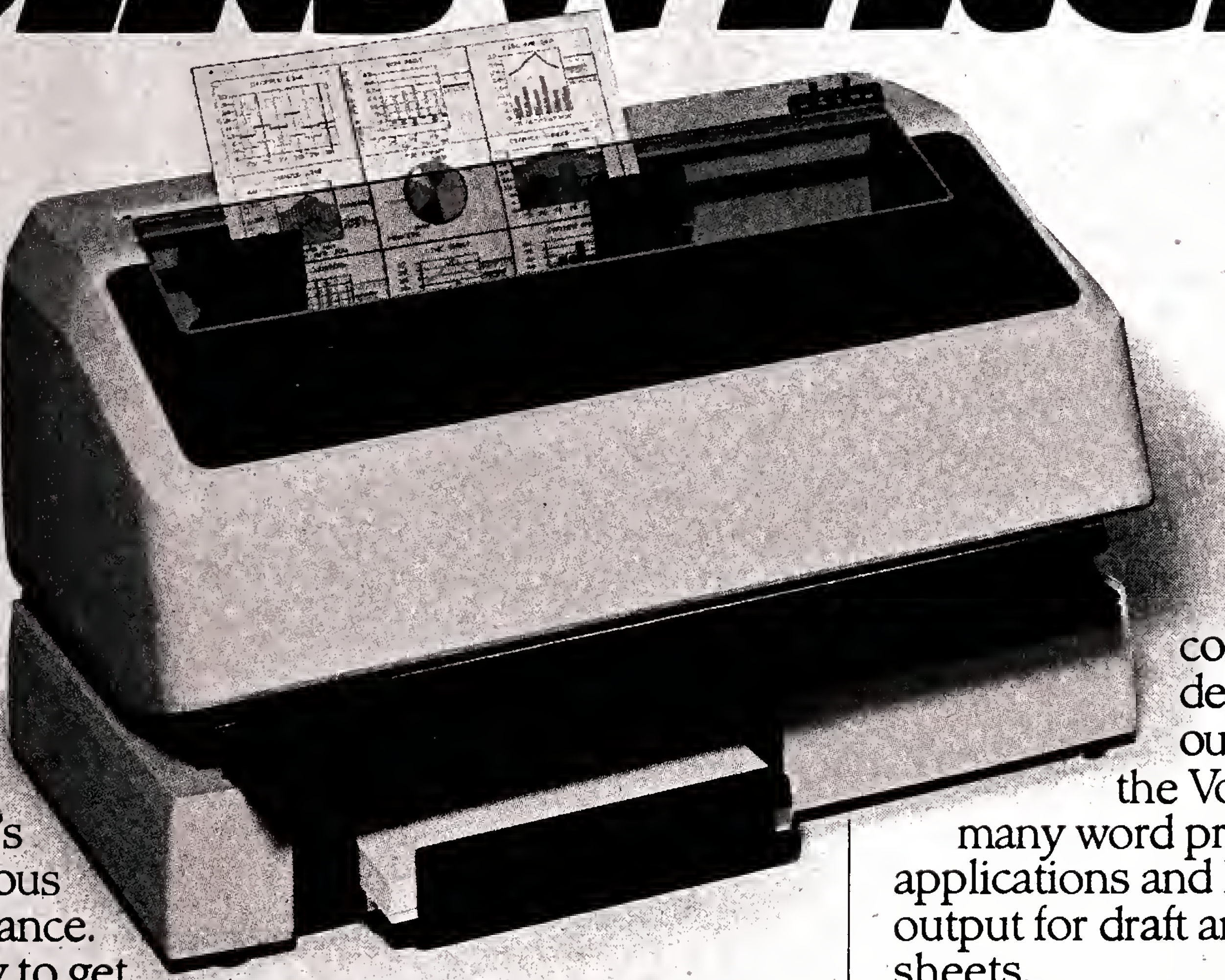

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The quality of strategic communication between business managers and information systems managers can be substantially improved if systems managers attempt to couch every issue in basic business terms.

had identified improved marketing information as a strategic business issue and had chartered an internal task force to address and resolve the problem. Because the effort was regarded as a "data processing" project, it was delegated to a task force of managers two organization levels below the senior executive staff.

As the design effort progressed, the operating manager on the task force began to expand the scope of the effort and add additional demands, including a major overhaul of the order entry system. In time, each task force representative injected his area's system "needs" into the project. As the size and complexity of the system's functional specifications grew, new technologies were introduced into the design to support the increased level of functional sophistication.

The MIS group at the company felt that the user demands were too complex and that the technology to be used posed significant risks. The group was unable to alter the view of the task force, however, and had no clear process of appeal to senior management. Communications between the two groups broke down, and senior management was clearly troubled at the scale of investment involved, particularly when the value the system would add to the business was becoming increasingly unclear. After watching the project flounder for two years, senior management finally intervened and retained the services of an outside consultant.

The delays in the project resulted from the narrow technical debates which had overshadowed the underlying business assumptions used to assess potential benefits. Another problem was the "loading up" of the project with lower level needs not related to the project's original strategic purpose. By refocusing the project on the business benefits the system would support, the company discovered that many elements that yielded the most value to the business were the least complex technically and the least expensive.

When senior management was presented with these results, it rapidly authorized implementation of the high-payoff elements. The technical debate had continued for more than a year; implementing the high-value elements took less than three months. The original system plan would have cost more than $4 million over several years and carried a high risk of failure; the high-payoff elements cost less than $100,000 and provided immediate strategic benefit to the business.

What can be done

Fortunately, there are actions that information systems managers can take to overcome obstacles and provide leadership in the pursuit of strategic systems for their organizations:

1. **Start talking in business terms.** Information systems managers have long had a tendency to favor a technical focus over a business focus in their discussions with management. Two factors contribute to this tendency. First, information systems managers are often excluded from many business discussions, especially those dealing with strategic business issues. As a result, they tend to retreat to their own turf, where their expertise is unchallenged. Second, the past five years have brought an explosion in the number of technical issues that must be mastered,

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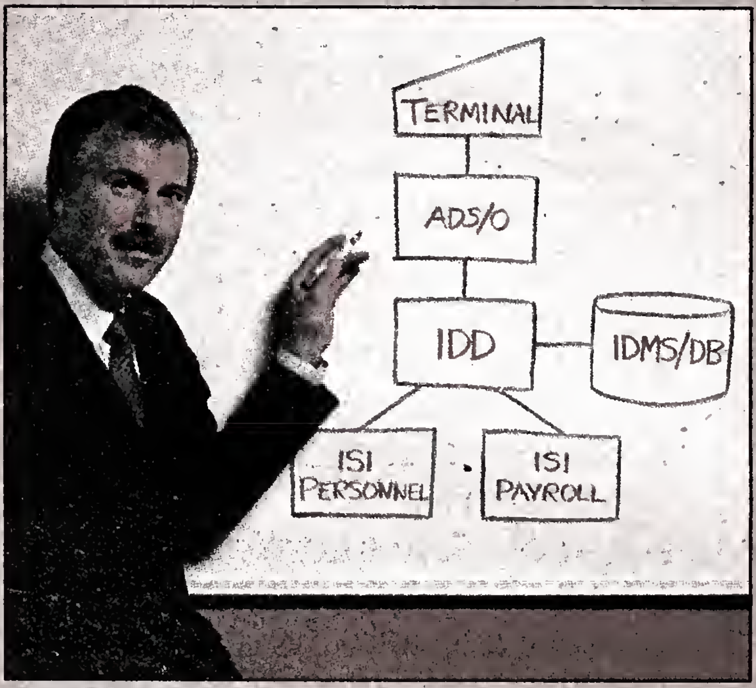

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What is often overlooked is that some technical issues become irrelevant to a business if the basic business issues are clearly understood. The quality of strategic communication between business managers and information systems managers can be substantially improved if information systems managers attempt to couch every issue in basic business terms.

2. Strengthen formal strategic systems planning. Many information systems professionals have come to realize that the benefits of formal information systems planning lie in improving the quality of communications with upper management. But this avenue is only available if the information systems organization makes a concerted effort to develop a strategic plan — one that identifies those areas of the business where information systems can be used to strategic advantage and develops specific action programs to pursue those opportunities. This type of plan is the strongest means available to an information systems organization for forging the link between its activities and the strategic business plans of the organization.

3. Use communications opportunities wisely. Unfortunately, information systems organizations are not always given the freedom to develop a good strategic systems plan. Such a plan requires communication with management, and senior managers are sometimes uninterested in a strategic systems planning exercise. In these cases, there are still opportunities to begin exercising leadership in the right direction.

The annual information systems budget and its defense provide an excellent opportunity to present convincing, high-quality thinking about the relationship between information systems and the business.

Every information systems organization is required to submit an annual budget. This budget and its defense provide an excellent opportunity to present convincing, high-quality thinking about the relationship between information systems and the business.

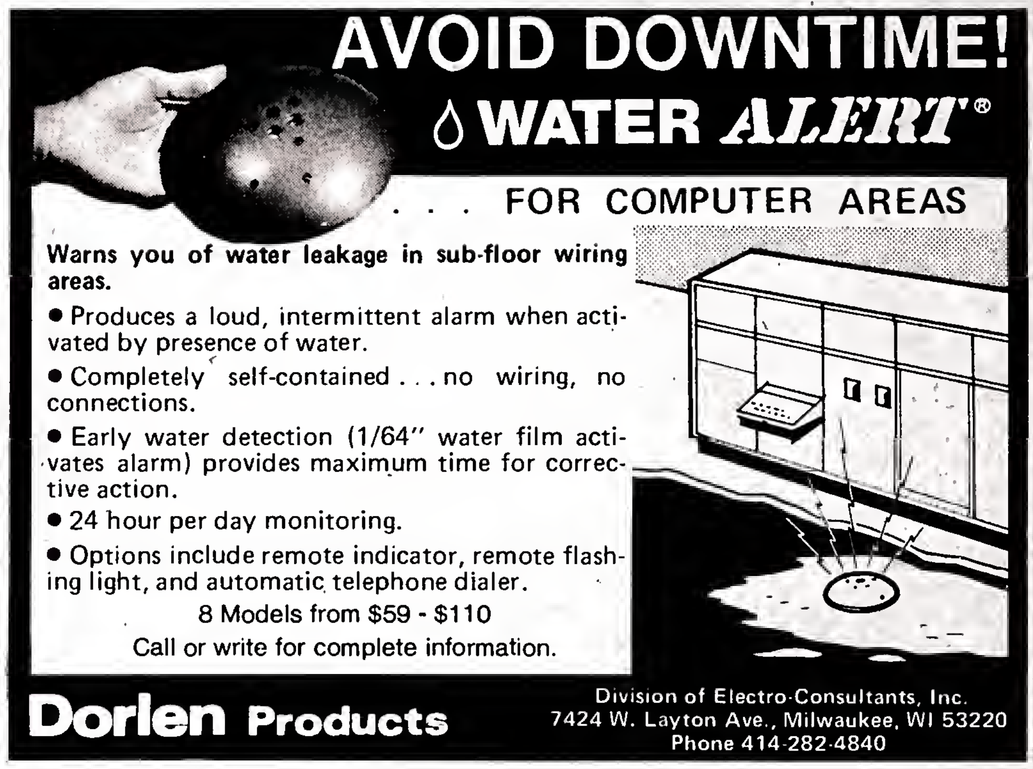
In addition, some information systems organizations have found the production of an "Information Systems Annual Report" to be an effective starting point in restructuring communications with senior management.

Such a report lays out issues the information systems organization feels are critical for senior management to understand and can be written using internal information systems resources and then forwarded to senior management for review. While seldom solicited, this type of report has proven useful for several organizations in establishing a dialogue with senior management.

No longer can the information systems function operate simply as a passive service organization if strategic opportunities for the use of such systems are to be realized. The systems organization must forge a link with senior management so that its resources can be channeled into the strategic thrust of the business. Linking these two interests is often difficult, but it is vital.

About the Author

David G. Robinson is a vice-president of Index Systems, Inc., a consulting firm in Cambridge, Mass., that specializes in the management of information technology. Robinson is responsible for the firm's strategic systems planning services. As a specialist in the planning and management of information systems in large organizations, he has consulted to manufacturing, transportation, financial and government groups.



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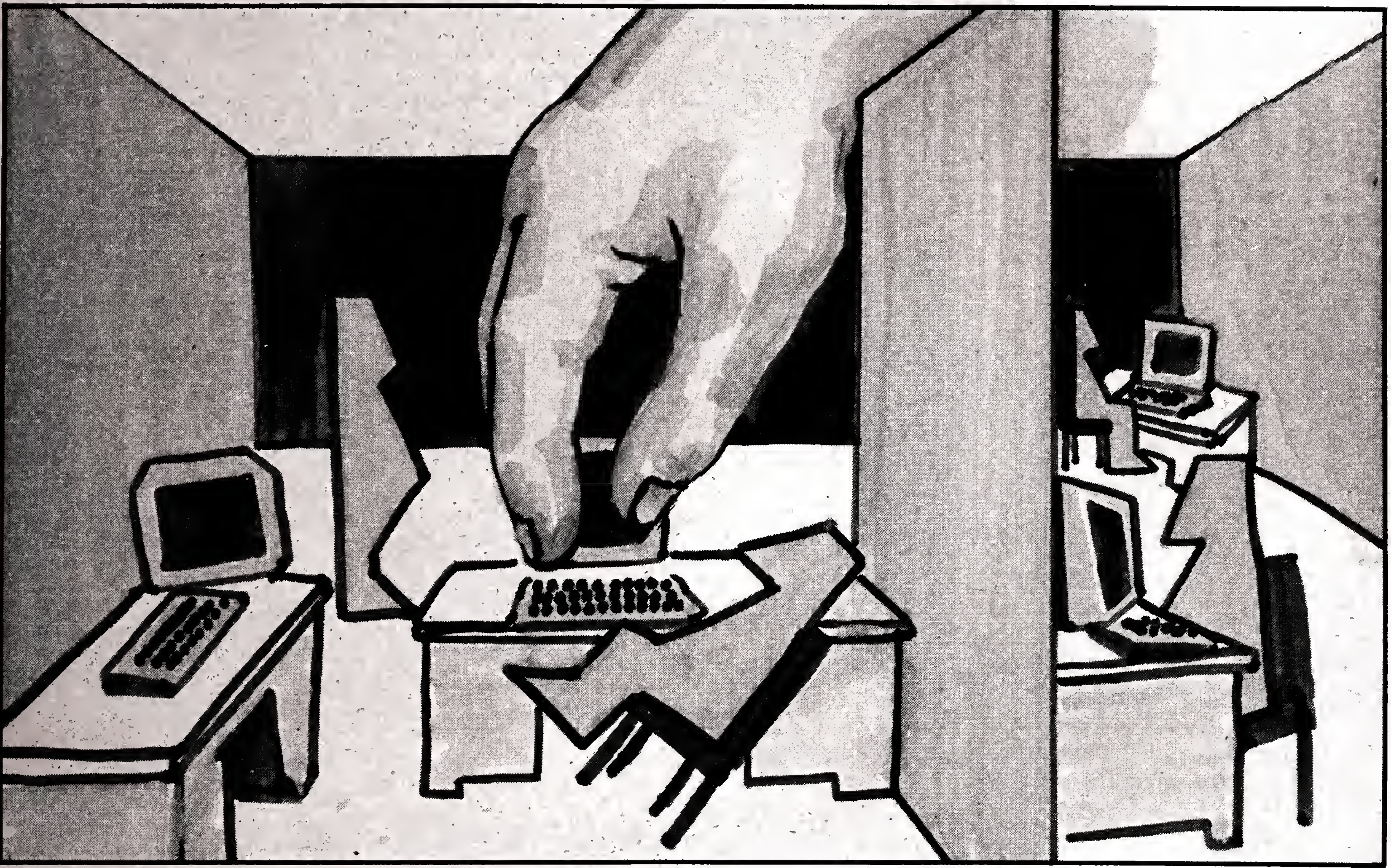

Illustration by Kristie VanValkinburgh

Where information power can change your company

By Gregory L. Parsons

Significant advances in the related technologies of computers, telecommunications, data access and storage devices, graphics equipment and software have created a spectrum of opportunities for managers. The speed, cost, size and capabilities of the new information technology continue to improve rapidly, and there appear to be unlimited applications that could be "computer enhanced."

However, in spite of this new wealth of technological advances, the ability of most businesses to assimilate and apply information technology lags far behind the available opportunities. Although many authors have noted this shortfall over the years, the effect in the 1980s of this "strategic gap" is much more critical. Senior executives increasingly feel that their businesses should receive more benefit from technology investment, but few are able to articulate the impact information technology has or should have on their businesses.

The Executive's View

In a recent study, three senior executives not directly involved in the technology were asked to assess the impact of information technology on their businesses; their responses were quite different. A divisional president of a large industrial corporation said: "I think information technology contributes at least 3% of our bottom-line profit margins. Operationally, we couldn't get through the week without the system support, and in the marketplace, I don't think we could hold our market share without the technology. But this is mainly a gut feeling; I can't back up these estimates with numbers or specific reasons."

The chief strategist for a major U.S. bank said: "The technology is our top strategic concern, not because it outweighs everything else, but because we are unsure what to do with it. Although we have a strategy for the marketplace, the technology issues seem to be eluding

Information technology can fundamentally change whole industries by altering product life cycles or speeding distribution. It can create new business rivals, new consumer demands, new profits. How are you putting information technology to work in your company?

(Reprinted from "Information Technology: A New Competitive Weapon," by Gregory L. Parsons, Sloan Management Review, Vol. 25, No. 1, pp. 3-14, by permission of the publisher. Copyright © 1983 by the Sloan Management Review Association. All rights reserved.)

Industry level
Changes:
Products and services
Markets
Production economics

Firm level
Affects key competitive forces:
Buyers
Suppliers
Substitutions
New entrants
Rivalry

Strategy level
Affects a firm's strategy:
Low-cost leadership
Product differentiation
Concentration on market or product niche

Figure 1. Three-level impact of information technology

us. On the one hand, it's important — everybody agrees on that, but then we end up doing projects based on a series of piecemeal technical decisions. We can't seem to grasp the bigger picture."

The chief financial officer of a large consumer goods manufacturing company explained his view of information technology: "We've really cleaned up our data processing act since the mid-1970s. The systems run well and now we're mainly fine-tuning. I expect we'll be doing primarily maintenance programming in the foreseeable future. I feel that we've gotten most of the benefits from the technology currently available. As the cost comes down, more projects will be financially justified, and then we'll do them."

From these remarks and the comments of many other senior executives questioned about information technology, two issues are clear. First, the importance of the technology varies widely from firm to firm. In some, it is a top-level strategic concern; in others, it is basically perceived as an administrative convenience. Second, there are no commonly accepted guidelines or framework for measuring the importance of information technology to a business. Most planning approaches do not take into account the strategic relevance of the technology. Although executives claim a "feeling" about the technology's importance, few could explain why it was so important. Even fewer could articulate how important information technology should be for the future.

Clearly, information technology is significantly affecting many firms and is now or will become a strategic concern for many over the next five years. It has been estimated that more than $1 trillion will be spent on information technology investments during that period. Figure 1 presents a three-level framework to help senior managers assess the current and potential impact of information technology.

This framework was developed from a two-year study of more than a dozen companies. It is based on a recognition and analysis of the competitive environment and strategies of business and focuses on the opportunities for firms to use information technology to improve their competitive positions. In order for information technology to become a viable competitive weapon, senior management must understand how information technology may impact the competitive environment and strategy of the business.

Impact at industry level

At the global level, information technology changes the fundamental nature of the industry in which the firm competes. When information technology changes an industry, it may affect the nature of the industry's products and services, the industry's markets and/or the industry's economics of production.

Products and services. In some industries, information technology may change the very nature of the industry's products and services: Information technology may substantially alter the product life cycle and significantly increase the speed of distribution.

For example, because of advances in information technology, the products and services of the publishing industry are undergoing significant changes. As the industry moves from a paper product to an electronically based one, the time and space constraints for product development and distribution are shortened. Authors and news sources are preparing electronic manuscripts and text, which are sent to publishers on floppy disks or directly from computer to computer. Electronic manuscripts are edited on word processors, typesetting is computerized and graphics are generated by computers. Promotional materials are distributed by telecommunications, and readers can buy the product from the publisher's electronic data base.

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reduced the product development cycle, gaining a significant advantage over large competitors.

Markets. Information technology can significantly change the markets of some industries. For example, financial companies will face a market of computer-literate consumers and businesses that will demand electronically based products and services. Information technology has already created a new product line called cash management systems, which are offered by large banks. As information technology erases traditional geographic market limitations, financial services companies must now compete in a global market. The emerging technology for automatic teller machines (ATMs), home banking and electronic funds transfer is making more sophisticated financial products and services possible and increasing the overall demand.

Production economics. Information technology developments may change the basic economics of production in some industries. In the distribution industry, information technology is dividing businesses into two categories: those that have computerized warehousing and inventory control and those that have manual operations. Businesses with computerized capabilities have the ability to serve a national market and are breaking the industry pattern of regional distribution. Such national distributors also enjoy other advantages, such as economies of scale in marketing, software and hardware. Because of control problems and high costs, businesses with manual operations are limited to local markets by their technological position.

Information technology will also affect the production economics in some industries by changing the industry's historical trade-off between standardization and flexibility. Some equipment manufacturing plants have already used information technology to achieve unit costs that remain essentially constant, whether one unit or one million units are produced. This new potential will effectively remove many of the traditional competitive advantages in these industries.

Information technology will reduce historical economies of scale in some areas while extending them in others. Because of the monitoring, controlling and coordinating potential of the technology, larger and more efficient facilities can be built which will capture new economies of scale by utilizing machinery, space, energy and specialized labor more efficiently.

There are critical implications for firms that compete in industries in which information technologies are changing the nature of the business. Traditional rules of competition will change, new economies of scale will evolve and entry barriers will erode in one area and spring up in others. There will be new competitors, new products and services, new distribution channels and different levels of demand and elasticity. Product life cycles will be shortened, and the value-added stream of the industry will be redistributed.

Before management can consider the long-run impact information technology will have within the firm, it must understand how information technology is changing the industry. This effort is entirely consistent with most views of corporate strategy, which begin with an understanding of the external environment of the firm. At the industry level, the impact of information technology ranges from major (in the banking industry, for example) to minor (as in the aluminum industry).

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Protocol discrepancy alarms	Yes	[illegible]	No
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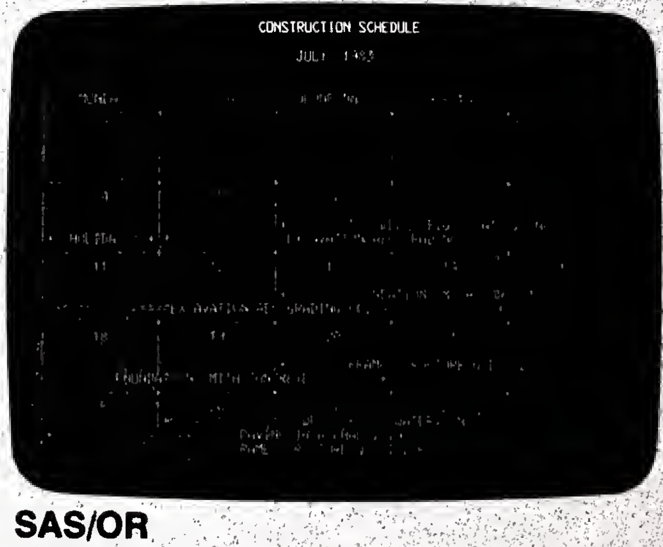

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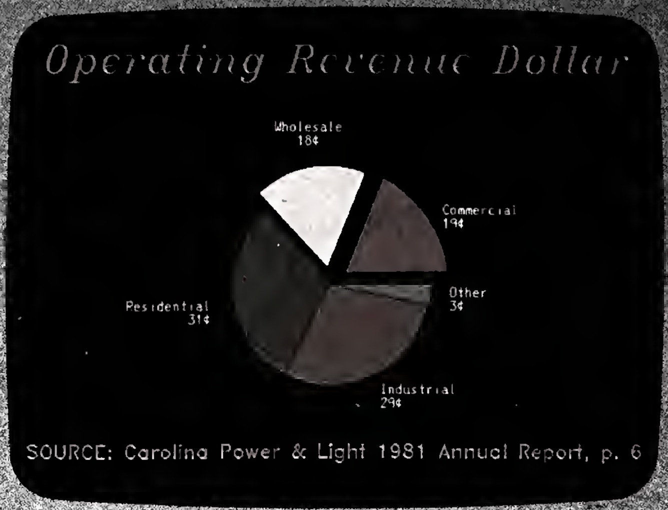

SOURCE: Carolina Power & Light 1981 Annual Report, p. 6

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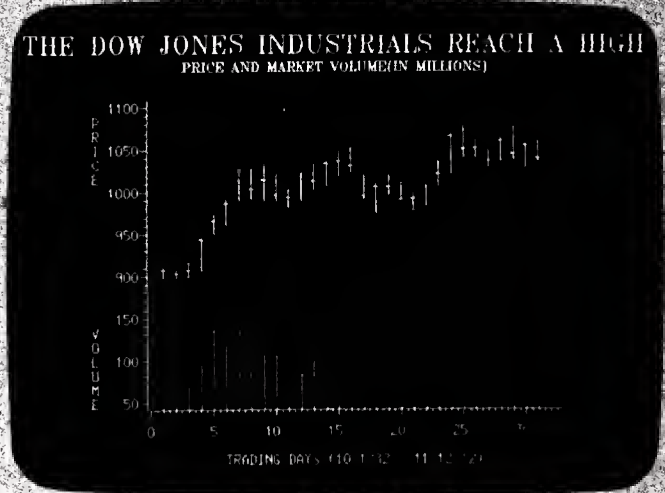

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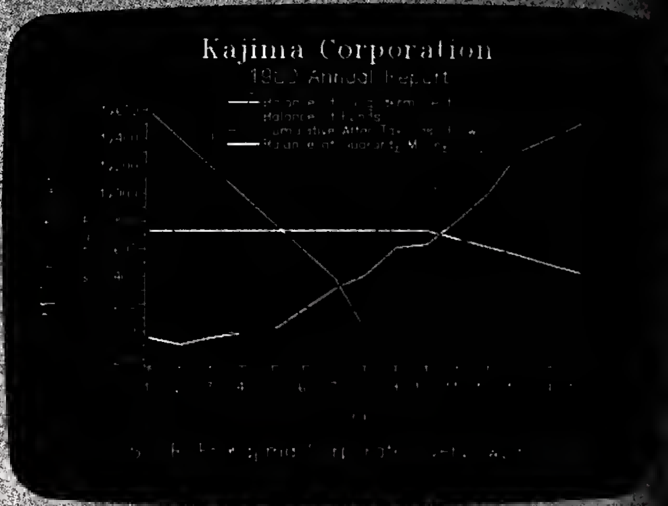

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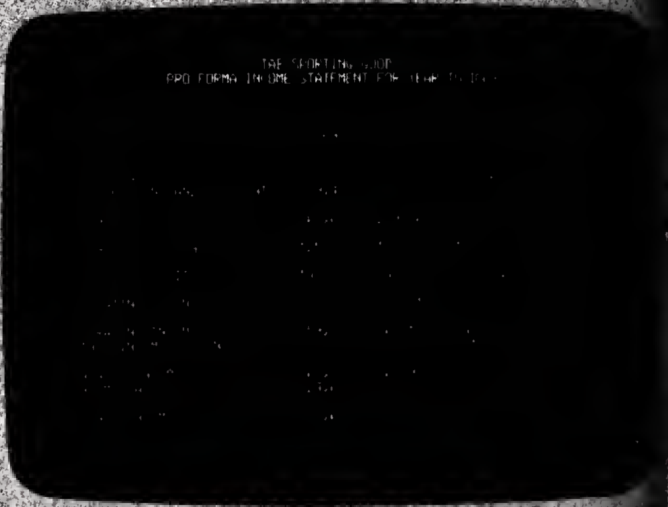

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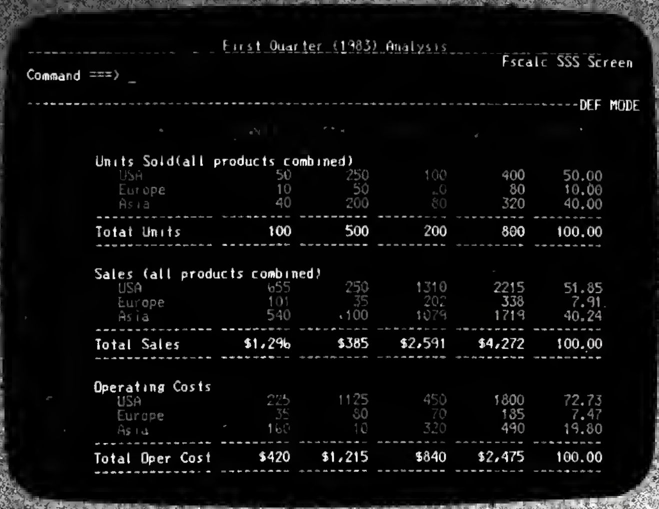

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                  First Quarter (1983) Analysis
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      Units Sold(all products combined)
         USA                  50        250        100        400     50.00
         Europe               10         50         .0         80     10.00
         Asia                 40        200         80        320     40.00
      -------------- ---------- ---------- ---------- ---------- ----------
      Total Units            100        500        200        800    100.00
      -------------- ---------- ---------- ---------- ---------- ----------

      Sales (all products combined)
         USA                 655        250       1310       2215     51.85
         Europe              101         35        202        338      7.91
         Asia                540       .100       1079       1719     40.24
      -------------- ---------- ---------- ---------- ---------- ----------
      Total Sales         $1,296       $385     $2,591     $4,272    100.00
      -------------- ---------- ---------- ---------- ---------- ----------

      Operating Costs
         USA                 225       1125        450       1800     72.73
         Europe               35         80         70        185      7.47
         Asia                160         10        320        490     19.80
      -------------- ---------- ---------- ---------- ---------- ----------
      Total Oper Cost       $420     $1,215       $840     $2,475    100.00
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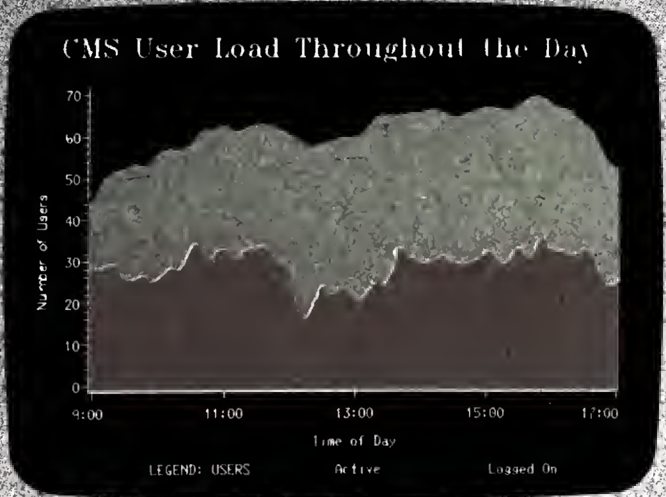

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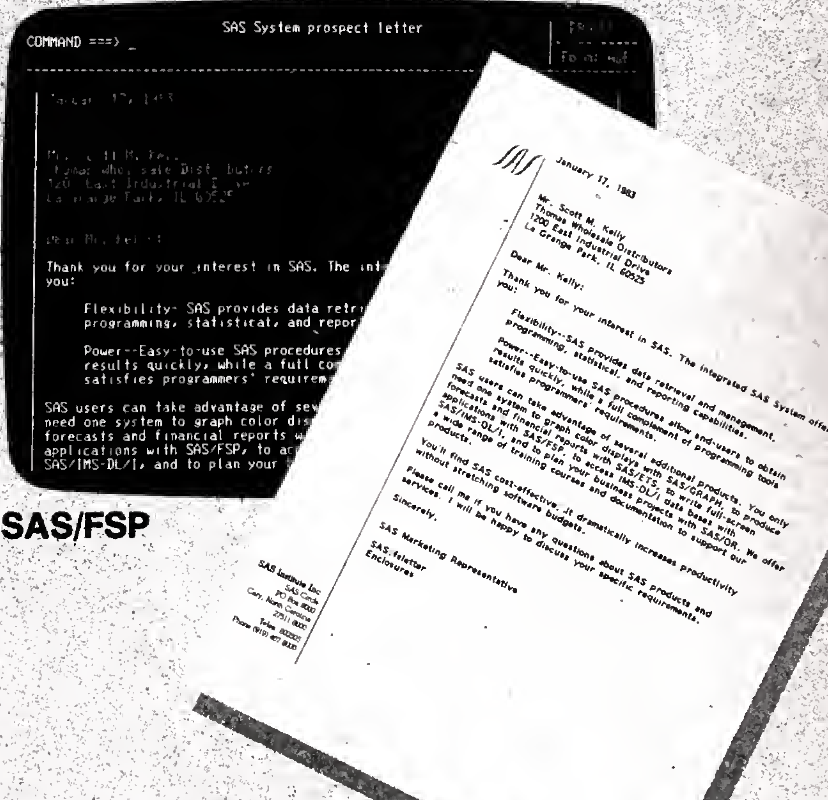

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strategic needs of the firm, management must anticipate the impact of information technology at the industry level *before* it occurs so that strategies can be developed to position the firm appropriately in the new industry setting. For example, given the current rate of development in telecommunications and office technology, videoconferencing may become a major substitute for some business air travel in less than 10 years. This change would significantly affect the airline industry's business travel market. Today's chief executive officer and strategist must address a crucial question: What impact will information technology have on our industry over the next five to 10 years in terms of products and services, markets and production economies?

Impact at firm level

The impact of information technology is determined by the specific competitive forces facing the firm. M. E. Porter, in *Competitive Strategy*, described five forces that form the industry structure and the competitive "arena" for each firm in the industry. These five forces are the buyers, the suppliers, the substitutes, the new entrants and the rivals within a particular industry. Each firm in every industry faces these five generic forces; the specific manifestations of these forces determine a firm's profitability and range of potentially successful strategies. This framework for competition provides a useful vocabulary for defining the key issues facing a firm today and in the future.

Competitive forces

As information technology affects the products, services or operations of a business, it may change the relationship between an industry and its suppliers. For example, the use of sophisticated quality control systems by the auto industry is forcing steel producers to become much more quality conscious. This matter is even addressed in contracts, and it will change the mix of suppliers. As industries become much more dependent upon information technology, the supplier will become an important force for a firm to consider when planning strategy.

The technology will also change the level of sophistication of some industries' suppliers. Suppliers of funds to financial institutions are increasingly sophisticated (and consequently more powerful) because information technology allows them to monitor and redeploy investments with astonishing ease. Competitively, firms in industries in which information technology is affecting the supplier relationship must be concerned with how this change will affect a supplier's power in dealing with the industry.

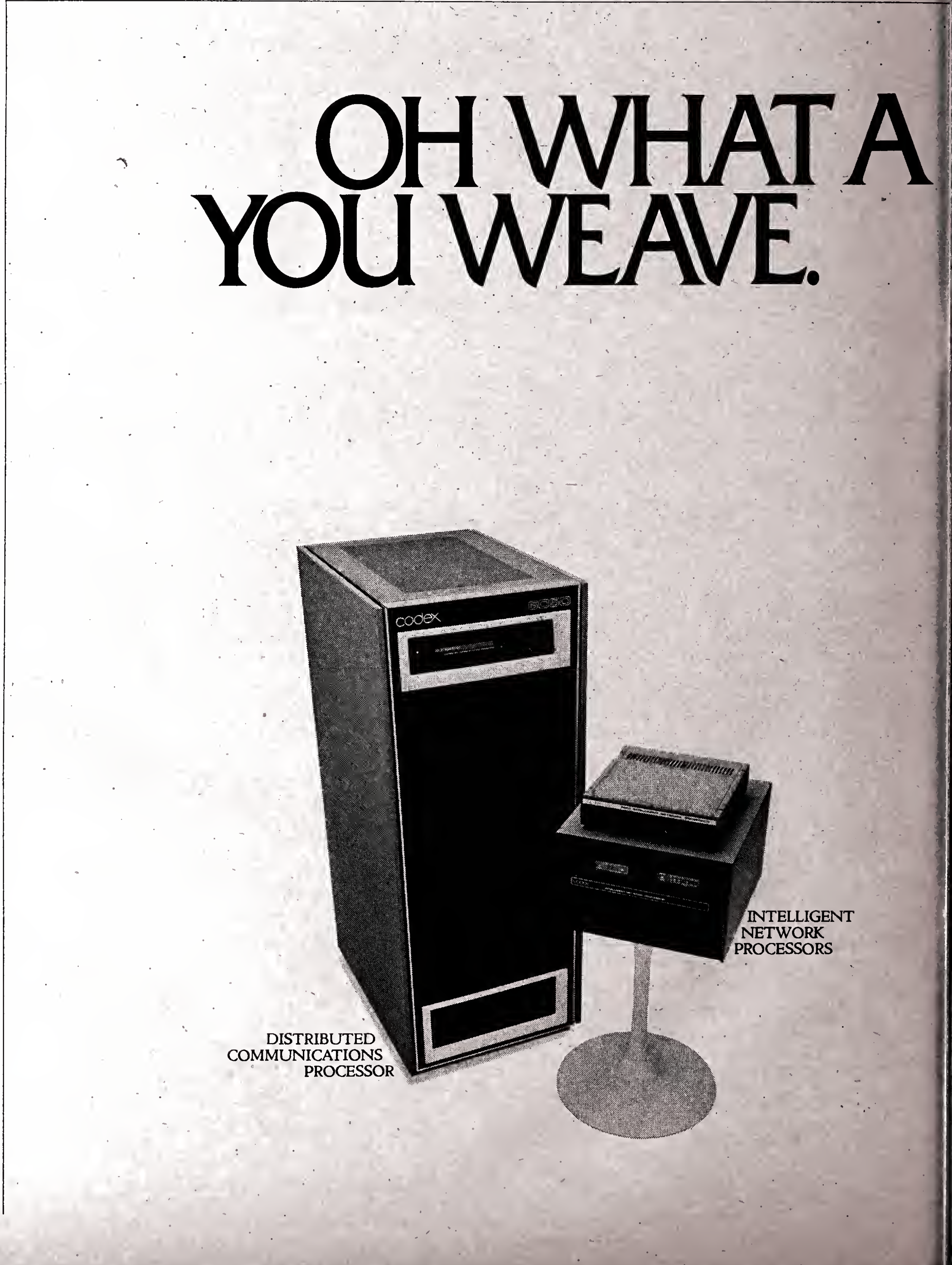
Information technology will also affect the buyer relationships of industries as new products, services and distribution channels evolve. Buyers in the banking industry can now choose products and services from a variety of channels. The buyer/industry relationship has been fundamentally changed by ATMs, point-of-sale (POS) terminals and electronic home banking. Information technology has also altered the product mix of industries as firms have packaged information around a basic service. For example, a large distribution company has enhanced its distribution service by offering retail customers computer-generated inventory management reports on a fee-for-service basis.

Information technology also affects the rate of substitution in some industries. For example, a large overnight carrier has recognized that electronic mail may substantially substitute for paper-based communications and is developing an electronically based business. Information technology will speed up the life cycle of many products by shortening the development process through computer-aided design (CAD) and computer-aided engineering (CAE). Firms that succeed by duplicating products at low cost will respond to product innovators much more rapidly and accelerate the substitution process.

Information technology affects the rate of new entry into industries by negating existing entry barriers or creating new ones. For example, in the banking industry, information technology-based access to banking services has seriously eroded the traditional entry barriers enjoyed by many branch offices. In the distribution industry, information technology has created new entry barriers by requiring investment in extensive computer and telecommunications networks that are used to control costs in large-scale multilocation distribution facilities. In effect, information technology has created a new scale-economy barrier that the new entrant must overcome in order to price competitively and still be profitable.

Finally, information technology

Each firm in every industry faces five generic forces: buyers, suppliers, substitutes, new entrants and rivals. The specific manifestations of these forces determine a firm's profitability and range of potentially successful strategies.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changes industry structure by affecting the rivalry bases among intra-industry competitors. By introducing a new competitive weapon into various settings, information technology sparks outbreaks of firm warfare. Recently, American Airlines and United Airlines have used their reservation systems to competitive advantage by listing their own flights ahead of competitors' flights (termed "systems bias") and by negatively promoting competitors' flights.

> *By introducing a new competitive weapon into various settings, information technology sparks outbreaks of firm warfare. Recently, American Airlines and United Airlines have used their reservation systems to competitive advantage by listing their own flights ahead of competitors' flights (termed "systems bias") and by negatively promoting competitors' flights.*

Certain securities brokerage firms have exploited information technology to introduce a radical form of cost competition through the telecommunications and computer-based discount brokerage. In the banking industry, leading banks see smaller competitors joining forces through shared ATM networks. Clearly, information technology will contribute significantly to rivalry in many industries in a number of as yet unknown ways.

Because the competitive forces of buyers, suppliers, substitution, new entrants and rivalry can significantly affect a firm, managing information technology is a vital element of a firm's strategy and part of its competitive domain. Although information technology represents a challenge or threat to a firm's established ways of doing business, it also represents opportunities for gaining new competitive advantages. Information technology resources can be used as competitive weapons to improve a firm's position in its competitive environment.

Creating competitive advantages

Buying power. The buyer groups of an industry represent a force which, if strong, can reduce the profitability of an industry. For example, strong buyer power exists if customer groups are very concentrated or if they purchase large volumes relative to the industry's total sales. When a handful of buyers represents an industry's entire market, then the importance of each buyer to each selling competitor is so great that concessions are a way of life for the industry and potential profits are reduced. Buyers also have significant power if the cost of changing suppliers or changing to a substitute product is low. The lack of "switching costs" between an industry and its buyers can result in reduced profitability.

There are two ways in which information technology can be a strategic weapon for reducing buyer power. First, it can introduce switching costs, making it more costly for a buyer to change suppliers. Information technology has greatly increased the ability of many firms to raise switching costs for buyers. For example, a large medical supply company has provided on-line order entry terminals and inventory management software for customers. As the customers' systems are integrated with the supplier's, it becomes much more difficult for customers to order from a competitor. If customers change suppliers, they incur testing and implementation costs as well as the cost of retraining personnel and developing new procedures. The more sophisticated the systems, the greater the switching costs and the less power buyers have to indiscriminately switch to a competitor.

Second, information technology represents a strategic weapon for dealing with powerful buyers by providing the capability for firms to develop buyer information systems that determine the profit potential of various buyer groups. All industries have certain customers who are extremely expensive to service relative to the average customer. In addition, some firms are particularly well suited to service some customer groups but not others. However, it is usually very difficult for a manager to determine the overall attractiveness of a current or potential market segment to the business.

For example, because of the insurance industry's historical tradition of providing full service to all business customers, there has been no attempt to match products to customer segments in order to maximize profit. Consequently, although they have a wealth of data, most insurance companies have poor information to answer such crucial questions as: How much does it cost to service a particular market segment? How should our customer portfolio be pared to fit our particular capabilities?

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insurance customers increases significantly because of deregulation and competition, buyer selection is a key issue, and the strategic application of information technology resources will provide a competitive advantage.

Supplier power. Strong supplier groups may reduce much of an industry's potential profits. The suppliers of an industry include the sources for raw materials, machinery, capital and labor. Suppliers will be powerful if they are very concentrated or if the buyer faces very high costs to obtain information, to shop or to negotiate.

> *The lack of comprehensive information systems to monitor and evaluate a bank's current and future money position represents a severe strategic disadvantage in dealing with the major supplier — the financial markets. Information technology is a critical tool to help the banking industry respond effectively to fluctuations in these markets.*

Information technology represents a strategic opportunity for a firm when the technology can be used to mitigate the factors driving the power of suppliers, thus improving the firm's competitive position. For example, information technology can be used as a viable alternative to high-priced labor. Recent developments in robotics and computer-aided manufacturing not only reduce the cost of labor outright, but they also reduce labor's power to demand industry profits. A manufacturing company recently installed a real-time labor efficiency management system that is tied directly to the wage incentive system specified in the union contract. The owner of the business feels that this system has provided a significant advantage in dealing with his labor force.

Information technology can also be used to avoid high switching costs. One of the major problems facing the banking industry is its inability to manage strategically its largest single cost — the cost of money. The sources of funds for a bank include customer deposits, money markets and certificates of deposit. The interaction of various interest rates for these sources creates a complex problem for bank management, especially during times of extreme interest rate volatility. The lack of comprehensive information systems to monitor and evaluate a bank's current and future money position represents a severe strategic disadvantage in dealing with the major supplier — the financial markets.

Information technology is a critical tool to help the banking industry respond more effectively to fluctuations in these markets. Currently, the lack of strategic information technology severely limits the ability of many banks to gather, process and decide on optimal funds sourcing quickly.

Because of historical and economic conditions, many industries are subject to intense supplier power. Although some of this power is uncontrollable, the strategic application of information technology often represents a potential competitive advantage.

Substitution. The existence of cost-effective substitutes for a product (for example, margarine for butter) may limit potential profitability in an industry. In some instances, a substitute product can virtually eliminate an industry, as happened when the silicon chip-based calculator replaced the electromechanical adding machine. An industry must recognize that both existing and potential substitutes will affect the overall demand for products and the profitability that will result from serving the remaining demand.

This reduced profitability results from price competition with substitutes, the cost of advertising against substitutes and product innovation directed at substitutes. However, substitution also represents an opportunity for a firm within an industry to increase its own market by offering its products as substitutes to another industry's buyers.

Information technology becomes a potential strategic factor in dealing with the competitive force of substitution when information technology affects the buyer's decision to substitute or not. This decision is affected by altering the relative price performance comparison with the substitute by lowering cost or improving the perceived performance and by increasing or decreasing the range of functions performed by a product.

One example of substitution based on information technology involves a large brokerage firm that developed a new financial product to support a range of product features through a sophisticated information system. Although the product features existed separately in other products, the combination of features and easy customer use made this product an effective substitute for many existing products in spite of the price premium. This product has been extremely successful and now has a host of imitators.

New entrants. For existing competitors, new entrants present a concern because they will extract some of the industry's profits. For example, increased competition can be touched off by new entrants who use price-cutting tactics to gain market

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penetration, which occurred when the Japanese entered the U.S. automobile industry market. Unless industry demand grows fast enough to accommodate the number of new entrants, average profitability will decline.

Entry barriers are the major structural components of an industry that slow or exclude new entrants. Although entry barriers take many forms, sizes and shapes, they all create a more favorable situation for an existing industry participant than for a potential entrant.

> *Information technology can be used as a strategic element to deal with new entrants, both offensively and defensively. An insurance company has continually led the industry by building and maintaining a large on-line telecommunications network to its agents. As increasingly sophisticated insurance products are rapidly introduced, this network will continue to grow as an entry barrier.*

This better situation may be based on costs, reputation, service, technology or some other characteristic important to success in the industry. Entry deterrents are tactics or processes that an industry or a firm can employ to make a potential entrant reconsider his entry. Such actions as deep price cutting during a new entrant's test marketing can act as a deterrent by emphasizing the industry incumbent's relative cost advantage over the potential entrant, and it can also confuse the test market results.

Entry barriers and deterrents are key aspects of an industry's continued success. Without continual maintenance of the barriers, new entrants will sneak into the industry, usually at the most profitable segments of the market. A firm's strategy must also take into account entry barriers, because a new entrant will often target a vulnerable competitor. Industry leaders are particularly responsible for maintaining entry barriers and creating deterrents.

A firm that contemplates entering a new industry must consider the entry barriers to be overcome and any potential retaliatory action by the violated industry. There are a number of ways to penetrate a new industry, including undertaking joint ventures and acquisitions, focusing on a nonthreatening industry niche or developing new technology that circumvents historical barriers.

Information technology can be used as a strategic element to deal with new entrants, both offensively and defensively. For example, a major insurance company has continually led the industry by building and maintaining a large on-line telecommunications network to its agents. As new, increasingly sophisticated insurance products are rapidly introduced, this network will continue to grow as an entry barrier. Agents must now have much more on-line support, training and promotional backup, and this network provides that support. Without such support, a new entrant will not be an effective competitor.

Another example involves a large financial service company that has built a reputation of quality service and that offers the greatest geographical coverage of any competitior. The company's quality of service and ability to serve a worldwide customer base are built upon information technology capabilities, which represent a capital barrier and which support a reputation barrier.

Information technology will also be used by industrial firms trying to achieve new manufacturing economies of scale relative to competitors, new entrants and substitutes. The potential of these firms to gain scale economies using information technology will depend upon the possibility of going beyond stand-alone applications (which have been the predominant industrial use of information technology).

To develop new scale economies, information technology must be viewed as an organizing concept to use when redesigning the manufacturing process. New economies of scale will only be achieved by identifying the strategic impact of information technology and deploying information technology resources to achieve the desired competitive effect.

Rivalry. Industry rivalry can vary from very intense "guerilla warfare" to a very relaxed "country club" approach. Very intense rivalry depletes the industry of some potential profits, because actions detrimental to the entire industry may occur as competitors struggle to the death for an advantage. The airline industry provides a good example. Because of intense rivalry, airline companies are price cutting far below their real costs. Although one competitor may eventually win, the entire industry is losing.

Dealing with competitors strategically does not always mean destroying them. To operate effectively over time, most industries require a group of good competitors. Having proper competitors allows a firm to earn more profits, develop more new

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Thursday, February 2, 1984
User Sessions:
The Anatomy of the IBM PC
Defining Levels of Compatibility Between Systems
Overview of Compatibles: Desktops and Portables
Word Processing Software
Database Management Software
Business Graphics Software
Analyzing Your Software Requirements
Overview of Major Business Applications Software
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Friday, February 3, 1984
User Sessions: The PC in the Corporate Environment
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markets and create better entry barriers than it could alone. For a firm to cope strategically with the competitive force of rivalry, management must identify when to compete, when to cooperate and how to do so effectively.

Information technology presents major opportunities for companies to affect the degree of rivalry and the methods used to deal with it. Firms can improve both their own competitive position and the entire industry by utilizing information technology-supported data, information technology distribution channels and potential information links within the industry. In the banking industry, information technology represents a tremendous strategic opportunity for individual firms to deal with increasingly intense rivalry.

For example, smaller rival banks may share a common group of ATMs against a market share leader. In the airline industry, shared reservation systems are a way to improve overall service to the consumer. In the railroad industry, standardized data and communications networks between firms offer a way to improve railroad transportation service. Other examples of cooperative information technology use by rivals include computer-to-computer connections, joint information technology ventures and shared software.

Since information technology presents a virtually unlimited opportunity to structure the relationship between a firm and its competitors, information technology should be a vital component of any strategy for dealing with rivals. The key, of course, is to know which information technology relationships should be cooperative and which should be competitive.

The five forces of buyer power, supplier power, substitution, new entrants and rivalry shape the competitive environment for each firm in an industry. These forces vary in the manner and degree to which they will affect each firm in the industry. As part of its strategic analysis, each firm must identify the specific competitive forces and underlying economics that determine the strength and stability of those forces.

The importance of information technology as a competitive resource can then be estimated by isolating where information technology can be used to alter a competitive balance or parry a competitive thrust. Although this may sometimes happen by accident, the analysis presented here provides a method of identifying the most likely opportunities, and it should, therefore, improve a firm's luck.

Impact on strategy

The industry setting not only determines the average profitability for a firm, but it also forms the competitive environment within which a firm's strategy must operate. Successful firms in an industry position themselves relative to industry forces by effectively implementing one or more generic strategies:

■ Overall cost leadership on an industrywide basis.

■ Differentiation of products and services on an industrywide basis.

■ Concentration on a particular market or product niche.

Each of these strategies provides a general framework within which a firm sets functional policies and procedures and also performs activities that implement that strategy. If a firm executes one of these strategies successfully, it will enjoy an advantage relative to industry forces that will yield higher than average returns.

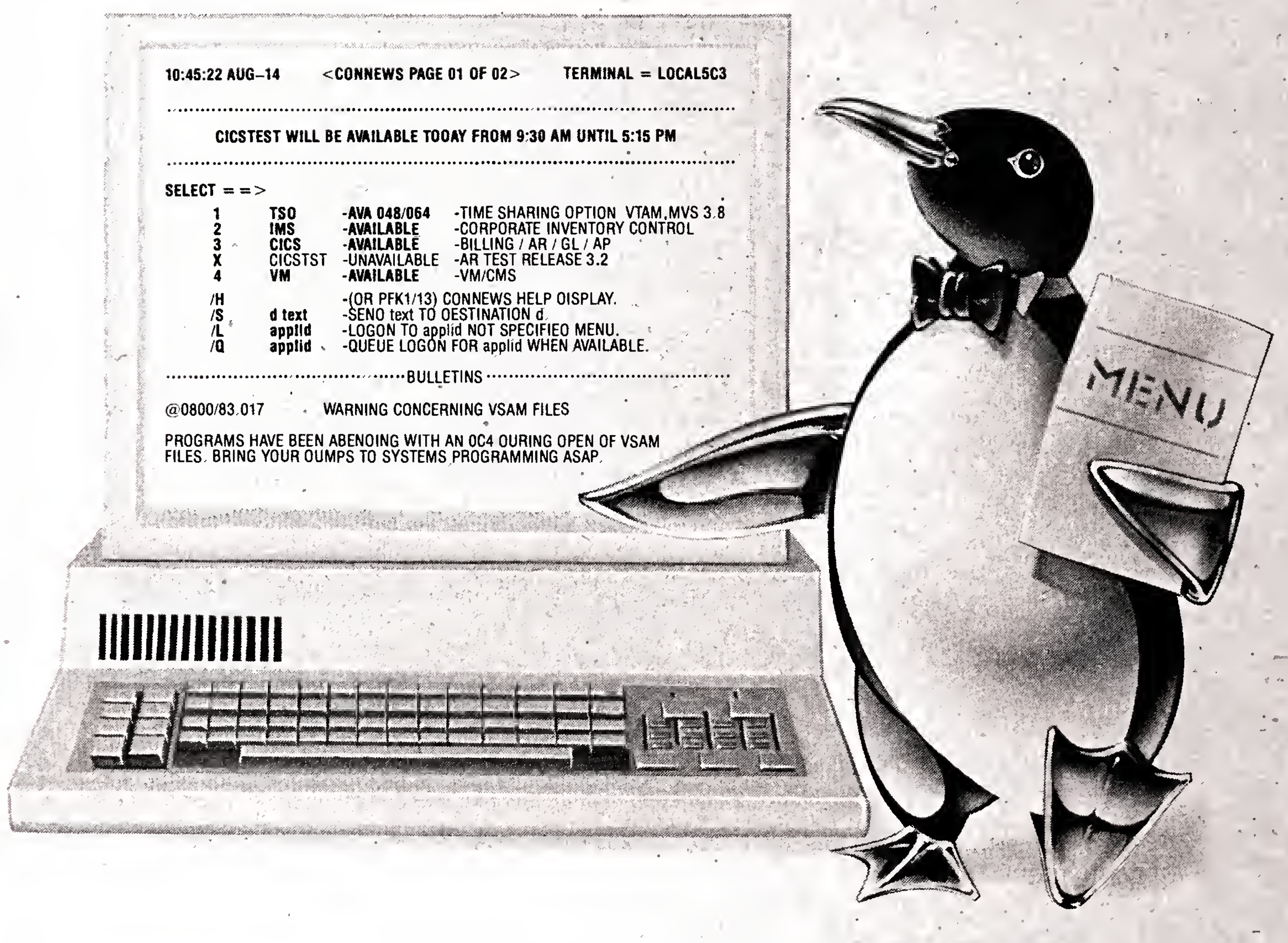
Information technology can affect the ability of firms to execute a particular generic strategy. For example, a large financial service company holds its cost leadership position in the industry because of a sophisticated application of information technology that substantially reduces the cost of transmitting and processing transactions. A manufacturing firm has distinguished its products by achieving levels of quality control and precision that competitors cannot match. The key to its advantage is a quality control information system and the heavy use of computerized machine tools, which provide much greater accuracy while tripling productivity.

Information technology can contribute to a generic strategy in a variety of ways, because the successful execution of such a strategy requires the broad support of all functional areas in a firm.

Information technology is utilized for experimentation support in research laboratories, for computer-aided design and engineering in engineering departments and for production control in factories. The technology is also used for market analysis and distribution support in marketing departments, as a sales tool in the field, for office recordkeeping and for planning in executive offices. In the long term, nearly all functions of all firms can be computer-enhanced to some degree. The strategic issue is: Given scarce resources of time, money and staff, which applications are most important to automate?

Supporting strategies

Clearly, a firm should use information technology to support, reinforce or enlarge its business strategy. In general, firms pursuing an overall cost leadership strategy should use information technology to reduce costs either by improving the productivity of labor or by improving the utilization of other resources, such as machinery and inventory. Firms following a differentiation



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      2     IMS      -AVAILABLE     -CORPORATE INVENTORY CONTROL
      3     CICS     -AVAILABLE     -BILLING / AR / GL / AP
      X     CICSTST  -UNAVAILABLE   -AR TEST RELEASE 3.2
      4     VM       -AVAILABLE     -VM/CMS

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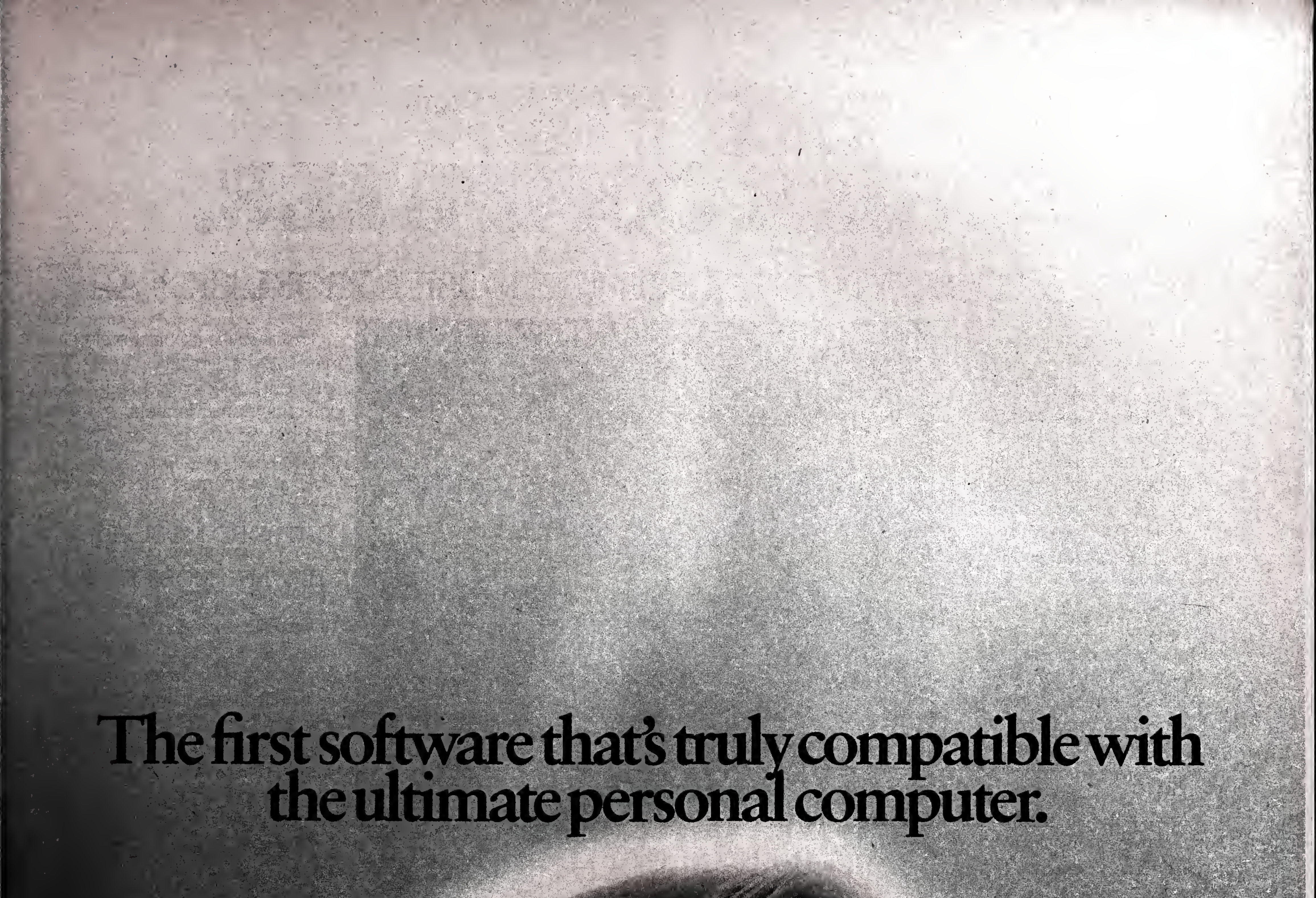
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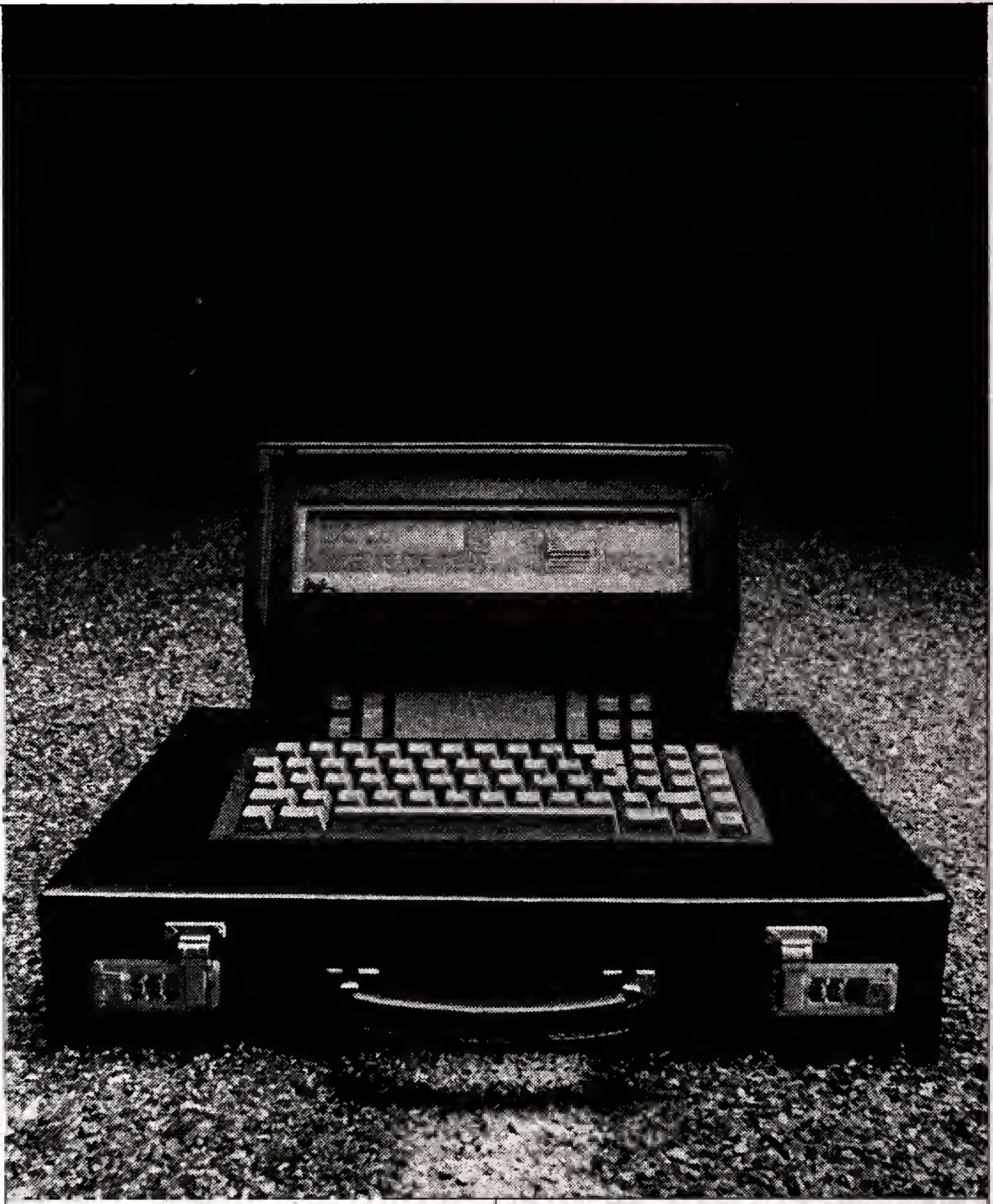

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strategy should use information technology either directly to add unique features to the product or service or to contribute to quality, service or image through the functional areas.

Although a firm may benefit from an information technology application that is not consistent with its competitive strategy, it will enjoy much greater strategic benefits from an information technology application that is consistent with and supportive of its competitive strategy. Understanding a firm's strategy is critical to the selection of appropriate automation projects, because applications that contribute to a cost leadership strategy are very different from applications that contribute to a differentiation strategy.

When a firm pursues a cost leadership strategy, information technology must create or support opportunities in these same areas. Information technology applications can substantially reduce costs in the functional areas of engineering, design and manufacturing. Information technology can also be used to reduce waste significantly, to improve productivity and to identify marginal customers. The firm that vigorously pursues a cost leadership strategy should identify and execute information technology projects that support and advance such a strategy.

Conversely, a strategy to achieve a differentiated position in an industry has a very different set of requirements. The differentiation strategy requires a perceived uniqueness in design, brand image, technology, product features, customer service, dealer networks or some other category. Usually, firms pursuing a differentiation strategy are most successful when they establish uniqueness in several categories. A distribution company specializing in periodicals differentiated itself in service reliability, responsiveness to customer needs and additional product features primarily through its computer systems. Among nationwide periodical distributors, this firm is perceived as the most sophisticated and highest quality firm in the industry.

Information technology can support a differentiation strategy in a variety of ways. It can contribute to superior customer service by providing historical customer profiles and by increasing the availability of spare parts with a dealer inventory system. Information technology can contribute to high quality through the use of quality control systems and through the use of computer-aided manufacturing systems, which provide flexibility and improved responsiveness to customer needs. Information technology can create better product designs, satisfying both manufacturing and marketplace requirements. In some instances, information technology can also provide access to markets that would otherwise be too remote to service.

Figure 2 shows how information technology applications must be specifically chosen to support the generic strategy of a firm. Applications supporting a low-cost generic strategy are designed to take advantage of

	Low cost	**Product differentiation**
Product design & development	Product engineering systems Project control systems	R&D data bases Professional workstations Electronic mail Computer-aided design Custom engineering systems Integrated systems for manufacturing
Operations	Process engineering systems Process control systems Labor control systems Inventory management systems Procurement systems Quality-monitoring systems	CAM Quality assurance systems Systems for suppliers Quality-monitoring systems
Marketing	Streamlined distribution systems Centralized control systems Econometric modeling systems	Sophisticated marketing systems Market data bases Graphics display systems Telemarketing systems Competition analysis systems Modeling systems Service-oriented distribution systems
Sales	Sales control systems Advertising monitoring systems Systems to consolidate sales function Strict incentive/monitoring systems	Differential pricing systems Office/field communications Customer/sales support systems Dealer support systems Customer order entry systems
Administration	Cost control systems Quantitative planning and budgeting systems Office automation for staff reduction	Office automation to integrate functions Environment scanning and nonquantitative planning systems Teleconferencing systems

Figure 2. Applications that support firms' generic strategies

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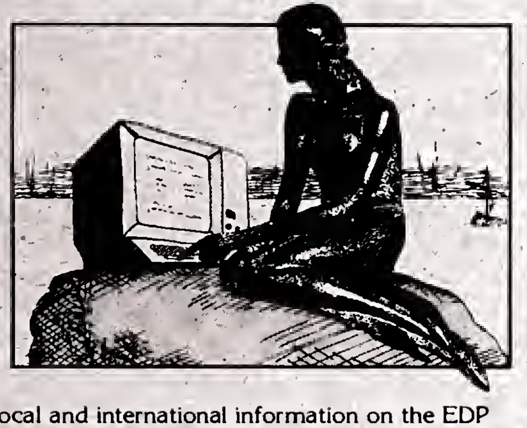

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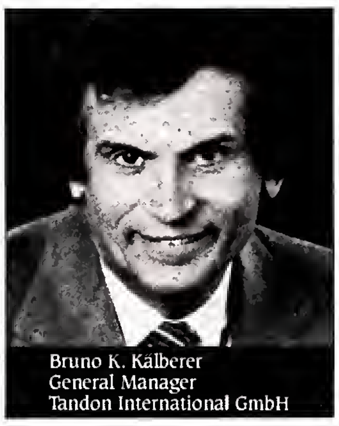

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> *Although it is clear that information technology applications should be consistent with a firm's strategy, little attempt is made in many firms to understand how the technology will affect the firm's strategic position in the industry or how it might support a business strategy.*

existing and emerging information technology to achieve a low-cost position in an industry. Applications supporting a low-cost strategy are substantially different from applications supporting a differentiation strategy.

The strategic success of information technology projects within a firm depends upon how well they support the firm's competitive strategy. In one instance, a firm following low-cost strategy gained little strategic benefit from a computer system that offered many options and much flexibility but that was very expensive to operate.

Over time, the overall cost leadership strategy of the firm continued to narrow the product line and to streamline operations, requiring the functional areas to standardize and limit options. The large, expensive, multioption system, which was still being developed, ran counter to the firm's strategy. As a result, the system was only partially used, and parts of it were never implemented. Now the users in operations correctly feel that using the system makes it difficult for them to meet their functional objectives as dictated by the cost leadership strategy. They want to scrap the system and buy their own package, which will run on a minicomputer.

In other firms, information technology developments were linked to a specific strategy, and users were very enthusiastic about implementing the systems. They felt the systems were valuable because they helped them carry out assignments within the overall strategy. System designers must realize that the strategic benefit will only be realized if there is a commitment to and acceptance of the system by multiple functions and levels in the organization.

Effective strategy requires coordination of many interfacing functions. Management must consider such factors as supporting subsystems, personnel and compensation to ensure an information technology system will contribute significantly to a strategy. For example, highly sophisticated, information technology-enhanced tools for selling insurance will not be effective if salespeople are not hired, trained and motivated to use the systems.

Although it is clear that information technology applications should be consistent with a firm's strategy, little attempt is made in many firms to understand how the technology will affect the firm's strategic position in the industry or how it might support a business strategy. For example, a number of major U.S. banks have recently removed their top information systems executives. Although a variety of explanations were given for these management changes, the underlying reason was that information technology was not being managed in a way consistent with the banks' strategic needs.

The problem, of course, was not that these executives could not develop technology consistent with the bank's strategy. The problem was and continues to be that neither the bank executives nor the information systems executives understand how information technology affects their business. Neither group can articulate how computer hardware and software should support or extend the bank's ability to make money.

For years, technical experts have expressed concern over whether a firm's computer systems met their needs. Unfortunately, these experts did not understand the needs of a business from a competitive viewpoint, as they did not perceive information technology to be in the competitive domain of a business. In spite of this general lack of strategic direction, firms in many industries are using information technology to their competitive advantage.

As technology continues to develop rapidly and becomes a major factor in more industries, firms must begin to manage strategically information technology. The framework presented here describes the first steps management should take to link information technology to a firm's competitive strategy by analyzing its impact at the industry, firm and strategy levels.

By understanding when, where and how information technology will affect a firm, management can develop an explicit strategy that makes the necessary trade-offs and directs resources to take advantage of opportunities while mitigating threats. Without such an understanding, firms will continue to ride a speeding technological roller coaster, spending more money and acquiring new hardware without sound business justification.

About the Author

Gregory Parsons is assistant professor of business administration at the Graduate School of Business Administration, Harvard University. He consults on information systems technology and its impact on competition and business strategy.

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Model	System 38/5	MV/6000	8890/30	6/92
Memory (Bytes)	2M	1M	1M	1M
Operating System	CPF	AOS/VS	Nidos/USE	Gcos/6
Language	RPG-III	Cobol	Cobol	Cobol
Data Base	S/38 DB	Infos	NDB	TPS-6

16 Bit	Digital Equipment Corp.	Microdata Corp.	Hewlett-Packard Co.
Model	PDP-11/44	Reality 2000	3000/40
Operating System	DSM-11	Reality	MPE-IV
Language	Mumps (DEC Standard Mumps	Basic	Fortran IV
Data Base	DSM-11	Reality	Image 3000

32 Bit	IBM System/38 Model 5 RPG-III	Data General MV/6000 Cobol	Honeywell 6/92 Cobol	Nixdorf 8890/30 Cobol
Data base creation	1 hour, 50 min	6 hours	1 hour, 5 min	1 hour, 6 min
Long query	4 min	4 min, 30 sec	1 min, 25 sec	4 min, 11 sec
Short query	1 sec	1 sec	1 sec	1 sec
Data base occupation (K bytes)	23.403	22.500	14.799	23.831
Lines of code	835	1,150	2,219	3,239

16 Bit	DEC PDP-11/44 Mumps	HP 3000 Fortran	Microdata Reality 2000 Basic
Data base creation	32 min	3 hours, 30 min	48 min
Long query (17,000 records)	3 min, 55 sec	2 min, 30 sec	15 min
Short query (50 records)	<1 sec	>2 sec	18 sec
Data base occupation (K bytes)	6.073	23.083	3.000
Lines of code (source)	183	2,684	391

Seven systems were evaluated in the benchmark tests. The results show how Mumps stacked up.

A case for Mumps

By Casimiro Alonso

In benchmark tests to determine the systems vendor for a retailing application, Mumps — perhaps surprisingly — proved the superior choice for programming language performance.

The system buyer's dilemma is familiar: "Overpurchasing" immediately results in wasted resources, and the waste may continue for years. Yet purchasing only enough computing power for current needs usually means that sooner or later the operations manager must choose among four distasteful alternatives: accept slow response times, limit the number of terminals and applications, redesign and reprogram applications or upgrade the CPU and install larger disks.

This situation is especially troublesome for systems vendors, like our company, who are often required to bid competitively on meeting a potential customer's needs. Overspecifying could mean losing the job to a competitor. Underspecifying means the system will fail to meet long-term customer needs.

We are always careful to examine solutions such as modular hardware that is easily upgradeable, software that is upward-compatible and distributed processing systems linked with local-area networks. Yet, more and more, we find that the simplest solution is the best: to provide the very highest system price/performance right from the outset.

Recently, hardware vendors have made great strides in improving the price/performance of microcomputers, as evidenced by Motorola, Inc. 68000-based systems. However, hardware vendors primarily stress machine performance and are not as aggressive in matching hardware improvements to software progress as some would like them to be. In fact, programming languages and operating systems have followed from mainframes to minis to superminis to micros without changing sufficiently to accommodate many of today's interactive needs. Now, this outdated software is often a bottleneck to a true increase in total system performance.

Put to the test

Just how much difference good system software can make in performance recently came out in a series of benchmark tests we were involved in as part of a bid to provide an administrative computer system to a department store.

Getting this contract required demonstrating superior performance, with the lowest overall cost, over several competitors in actual customer applications. Each

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competitive bid was based on providing both economical application development and an efficient run-time environment. In addition, we wanted to assure that the system we proposed was expandable and economical over the long term, as well.

From previous experience with the Mumps language, we were aware of its ability to improve programmer productivity and, thus, to reduce software costs by speeding up development time. We also liked the fact that Mumps provided easy portability from micros to minis to superminis. We were, therefore, inclined to go with a Mumps-based system. However, what overall effect Mumps would have on system performance and whether it would allow the full functionality required for winning the contract was unclear.

The data for the comparison was submitted by the different hardware vendors, and each vendor was kept informed of the results of each other vendor so as to encourage each to obtain the best possible performance from his system.

The benchmark took the form of comparing Mumps with other languages and data base systems in terms of disk occupation, processing speed and lines of code needed. Specifically, it consisted of:

1. Creating a data base with the following structure:

Files:

Parts file (1,000 records).

Color file (6,000 records) containing six "color" records per "part."

Size file (48,000 records) containing eight "size" records per "part-color."

Store file (288,000 records) containing six "store" records per "part-color-size."

Supplier file (20 records).

Family file (20 records).

Relationships:

Part-color-size-store (343,000 relations).

Store-part-color-size (343,000 relations).

Supplier-part (1,000 relations).

Family-part (1,000 relations).

2. Creating a data base that gives stock and sales charts as well as stock value per family part-color-size-store. The query implied the use of the "family-part" and the "part-color-size-store" relations. Two different queries were performed: a "long" one requiring access to 17,650 records, and a "short" one, accessing just 50 records.

On the data base creation test, Mumps was from half again as fast to 18 times as fast as the other systems. The Mumps data base also occupied only one-half to one-fourth of the disk space required by others. And Mumps programming required one-third fewer lines of code.

The chart on the cover page shows the technical specifications of the different systems evaluated in the benchmark.

Results on seven systems

Mumps performed much better than the other languages on almost every comparison run (again, see cover page). On the data base creation test, for example, Mumps was from half again as fast to 18 times as fast as the other systems. The Mumps data base also occupied only one-half to one-fourth of the disk space required by others. And Mumps programming required one-third fewer lines of code.

In summary, in different comparisons on various machines, Mumps was bested only once.

A more significant fact is that a Digital Equipment Corp. PDP-11/44, running Mumps, actually outperformed all 16-bit and most 32-bit minis on most of the tests.

This data indicates that a user choosing Mumps software for interactive data base applications can expect up to five times more power from a given computer. And this power, in turn, will eliminate many of the performance problems encountered by minicomputers in administrative environments.

In addition, the data laid to rest the criticism that the

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> *The system we were prepared to recommend to our customer was a DEC VAX-11/750 under VMS, running VAX-11 DSM. This recommendation was made to allow the user to take advantage of Mumps as well as gain the 32-bit capability and future growth and versatility of the VAX.*

Mumps "interpreter" approach imposes performance penalties on applications. The results show clearly that Mumps is not at all slower than other software. Indeed, it offers an incredible performance increase over competitive systems.

For these reasons, we decided to recommend that our client go with a Mumps applications program.

Implementations on DEC CPUs

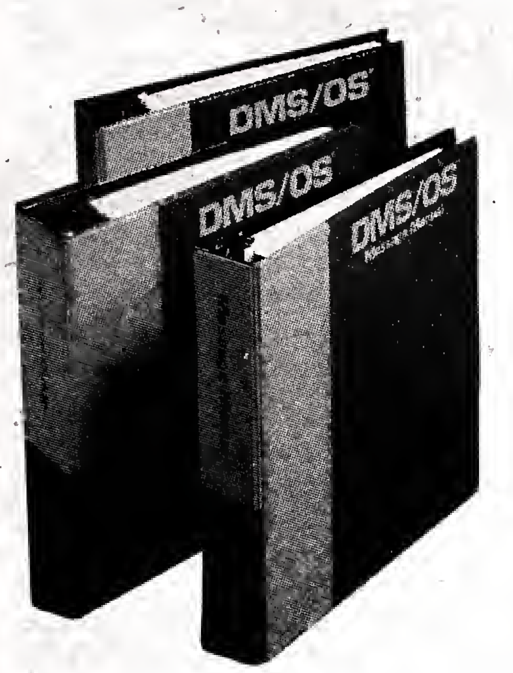
At the time of the benchmark comparisons, the development system in our company was a DEC PDP-11/44 with RK07 disk drive running DEC-standard Mumps, DSM V2.2.

The system we were prepared to recommend to our customer was a DEC VAX-11/750 under VMS, running VAX-11 DSM. This recommendation was made to allow the user to take advantage of Mumps as well as gain the 32-bit capability and future growth and versatility of the VAX. However, it also meant that we would have to use an outside VAX to refine the programs after we developed them on our own in-house 11/44. This procedure presented no problem, because no modification of source code would be needed in order to move the Mumps programs between the 16- and 32-bit CPUs.

The performance obtained in-house with the 11/44 was exceptionally good and placed us far ahead of the others preparing competitive proposals. It also provided a large margin for the additional overhead burden we expected in moving from the PDP-11's dedicated operating system to the general operating system of the VAX. Unfortunately, when moving to the VAX, the overhead turned out to be greater than we anticipated and threatened to wipe out much of our competitive advantage.

Before making the final proposal, we decided to test the latest Mumps implementations on the VAX to see how much, if any, performance improvement was possible. We contacted both DEC and Intersystems Corp., two major Mumps suppliers, for help. DEC responded with an improved, experimental VAX-11 DSM (2.1); Intersystems with its current M/VX.

The basic difference between DEC's experimental and current



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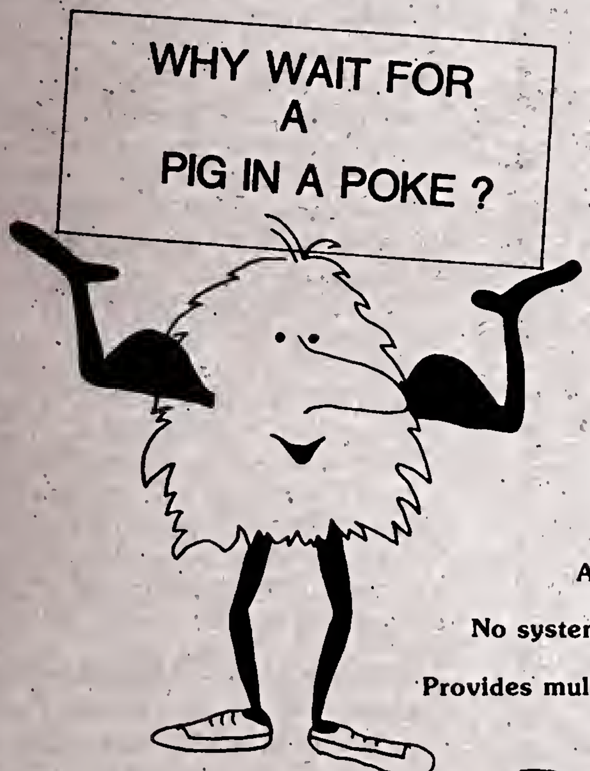

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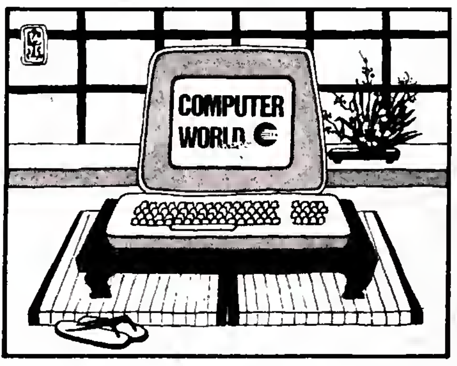

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	DSM 2.2 11/44 RK07	VAX DSM1.2 780 RM05	M/VX 780 RM05	VAX DSM2.1 750 RM80	M/VX 750 Fujitsu Eagle
Data base creation	32 min	2 hours, 57 min	13 min	37 min, 20 sec	20 min, 52 sec
Data base query	3 min, 55 sec	8 min, 30 sec	1 min, 37 sec	4 min, 4 sec	2 min, 50 sec
Data base disk occupation (K bytes)	6.073	10.5	5.4	—	5.4

Figure 1

	M/VX	Cobol	Ratio
Data base creation	13 min	2 hours	923%
Data base query	1 min, 37 sec	2 min, 35 sec	159%
Data base disk occupation (K bytes)	5.4	21.7	401%
Lines of code needed	183	1,050	573%

Figure 2

VAX-11 DSM is that the new version uses a global handler that minimizes the use of RMS Isam files to store data base files ("globals" in the Mumps world). The currently marketed version relies heavily on the use of RMS Isam files.

M/VX does its own data base handling within one RMS file. It is more specialized software, designed to minimize dependency on both operating and record management systems. Since it minimizes dependency on operating system facilities, it avoids much of the overhead associated with general operating systems.

The comparative test of these implementations produced a pleasant surprise (see Figure 1). The results show that DEC's experimental VAX-11 DSM X2.1 can provide performance on a VAX 750 comparable to that of an 11/44 running DSM-11. Further, they show that with M/VX, a VAX 750 can clearly outperform an 11/44, and a VAX 780 can become an "unbeatable" machine.

In short, these tests show that it is possible to combine the advantages of the VAX with the advantages of Mumps, without the performance losses resulting from the overhead of a general operating system.

Mumps, Cobol on VAX

Although the benchmark was set up to compare several systems, we also thought it would be informative to demonstrate to the customer the results obtained when running the data on the same VAX 750 using first Cobol, then Mumps. The results were as shown in Figure 2.

Because of this series of benchmark tests, our company was able to make a strong, well-supported recommendation for a powerful, versatile and fast hybrid system: a DEC VAX for 32-bit capability and future flexibility and Intersystems M/VX for high-performance Mumps applications programs.

On this recommendation, we were selected, and our customer ordered three VAX systems as described above. They are now up and running.

Prior to installation, the customer was also able to save considerable development time by assigning three programmers and a systems analyst, none with prior Mumps experience, to develop and test applications on our in-house PDP-11. This development work was possible because no conversion was needed when the applications moved later to the VAX.

The applications development took about one-third the amount of time that had been forecast for the use of other languages. Seven complex applications were developed in a space of about four months.

In addition, the customer got a bonus in disk space savings, which provides growth potential and a future possibility of saving money in disk configuration.

About the Author

Casimiro Alonso is vice-president for technical operations at Calculo de Sabadell, Barcelona, one of Spain's leading computer service companies. He holds an MBA degree from the University of Barcelona, where he was formerly a professor of operating systems design.

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SYSTEMS & PERIPHERALS

Export control crumbling

HARD TALK

TOM HENKEL

U.S. control over what hardware is shipped to foreign countries is falling apart. With more computer systems, peripherals and components being shipped today than ever before, it is becoming clear that the government hasn't the slightest idea where much of it is going.

It is impossible to check every box on every airplane, boat or truck that departs U.S. borders. And it's equally difficult to make sure computer systems that leave the U.S. for sanctioned sites actually reach their destinations.

Let's face it, no one really knows what happens to a box when it is shipped from point A to point B. Items pass through many hands and visit many freight yards before winding up, usually, at the address listed on the shipping label.

Sometimes things go wrong. While logic dictates that big things like computer systems just do not vanish, many DPers have spent days waiting for a desperately needed replacement part that was loaded on a truck on Tuesday and has not been seen since. There are hundreds of horror stories about shipped items, even entire freight cars, that have been missing for years.

The U.S. Customs Service recently snatched two Digital Equipment Corp. VAX-11/782 superminicomputers from West German and Swiss docks. They said those systems had been laundered out of the U.S. and were destined for the Soviet Union. They reportedly were to be used for military applications.

But keeping two VAX processors out of the Soviets' hands hardly solves the problem.

High tech has become a worldwide preoccupation. That means the United States no longer holds the plug to every computer system built. The Japanese, for example, make most of the components that go into the VAX, as

See **CONTROL** page 61

DP disasters hurt entire firm

Planning seen key to survival

By Lei F. Somogyi
Special to CW‡

Disasters in the computer room affect not only the DP operation, but the rest of the company as well. A corporation's cash flow can be interrupted, its position in the marketplace can be hurt, customer and employee relations can be strained and a firm's purchasing power can be jeopardized.

While there is no way to prevent many disasters, the risks and implications of a significant disruption of DP services cannot be ignored.

Planning is the key to survival in any contingency program. The goal is to get critical applications running as quickly as possible regardless of the reason the system is not working. For example, there can be hardware damage resulting from a fire, explosion or power failure.

But also remember that a system can be rendered helpless by other factors. For example, a data communications failure could make vital data inaccessible.

But contingency planning involves more than just finding innovative ways of getting the hardware back on-line. There are many issues to consider. For example, how much money will a firm lose if a critical application is lost? What happens if that application is down for an extended period of time?

Function at many levels

A contingency plan can function at many levels. It is up to the DP executive to determine which steps a firm should take to protect its data. This decision should include an economic justification of various contingency planning alternatives and integrate top management and user views.

A good contingency plan must also hold provisions to test and refine the plan.

There should be a framework for maintaining the plan. This involves training personnel in how to recover suc-

See **PLANNING** page 61

Selanar announces upgrades

SACRAMENTO, Calif. — Selanar Corp. has announced a series of graphics upgrades for terminals and printers produced by Digital Equipment Corp., Qume Corp., Televideo Systems, Inc. and Lear Siegler, Inc.

The SG480, SG481 and SG482 reportedly are user-installable, high-resolution graphics upgrades for the DEC VT100, VT101 and VT102, respectively, featuring 800- by 480-pixel resolution and Tektronix, Inc. 4010 and 4014 emulation with enhanced graphics module. They feature variable character sizes, variable line types, point plot, incremental plot, write-through mode and cross-hair cursor.

The upgrades are priced at $1,195, the vendor said.

Also announced by Selanar were the SG101-D and SG102-D low-resolution upgrades for the DEC VT101 and VT102, respectively. They reportedly feature 700- by 250- by 2-pixel resolution, Tektronix 4010 and 4014 emulation and user installation in less than 15 minutes. They are priced at $795.

For the Lear Siegler 3A, 3A Plus and 5, Selanar is offering the SG305 low-resolution retrofit board. It reportedly features 640- by 240- by 2-pixel resolution, Tektronix 4010 and 4014 emulation and 30-minute field installation. It is priced at $795.

Selanar also announced the SG970 and SG102Q, which are retrofit graphics boards for the Televideo 970 and Qume QVT102 terminals. Priced at $795, they reportedly feature Tektronix 4010 and 4014 emulation with enhanced graphics modules and are user installable in less than 20 minutes.

The Selanar SG120V provides stand-alone Tektronix 4014 graphics and is compatible with the DEC LA34, LA50, LA100 and LA120 printers.

According to the vendor, the SG120V offers a resolution of 132 dot/in. horizontally by 72 dot/in. vertically, a 7,000-vector buffer, a 100K-byte spooling buffer, switch-selectable bit/sec rates between host and printer, eight selectable picture sizes and rotation of picture. It is priced at $1,095.

Selanar, 4212 N. Freeway Blvd., Sacramento, Calif.

TARGA

Targa Electronics Systems Inc.

Targa Electronics offers bubble memories/**62**

INSIDE

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- Hewlett-Packard announces printers/**64**
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- Attorney work-station/**63**
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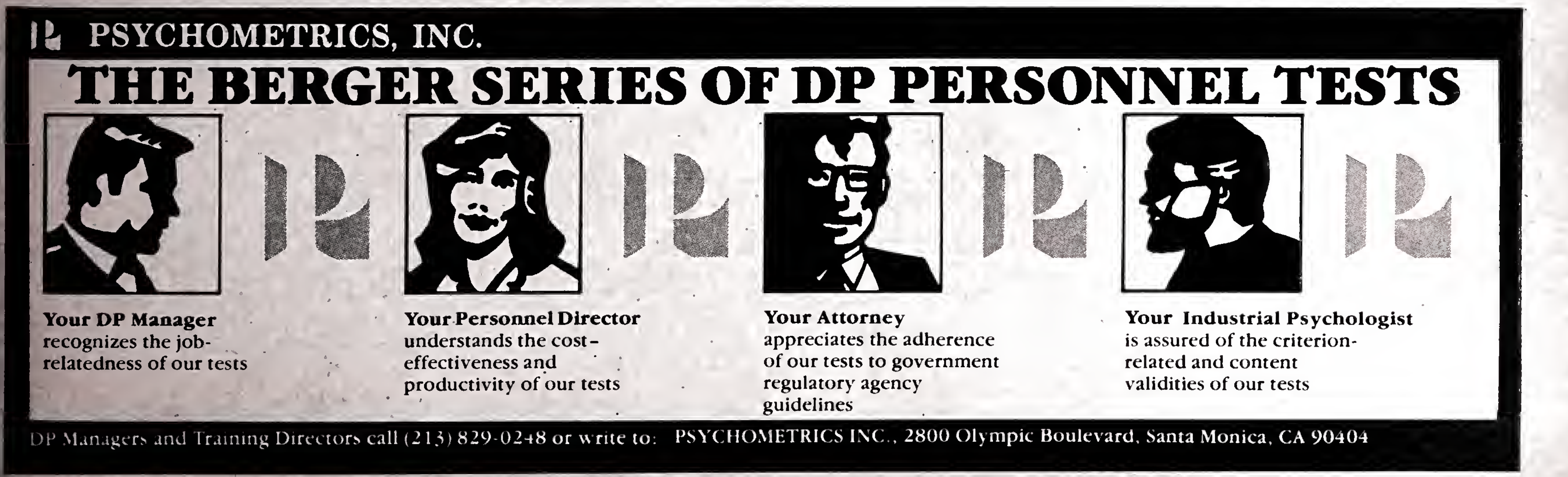

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IBM to ASCII

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We've added a little polish to our Series II family of protocol converters. The result is the Series II *Plus*, a complete line of SNA/SDLC and Bisync protocol converters. If you've become accustomed to the performance of KMW 3270, 3770, HASP and 2780/3780 protocol converters, you're going to appreciate the *Plus*.

Pluses

+ Diagnostics

The KMW Series II *Plus* provides three levels of extensive on-board diagnostics for troubleshooting without ever opening the unit. Level one testing includes PROM and RAM tests as well as confidence tests of most system components. Level two testing is a much more comprehensive test of system components including I/O circuits. Level three is controlled via the system console and includes the ability to move data files to each of the supported peripheral devices.

+ Programmability

Host session and asynchronous device parameters are programmable via the setup mode on the system console. Programmable host session parameters include:

- log on information
- buffer size
- device address
- data rate

Programmable asynchronous device parameters include:

- device type
- input mode
- output mode
- character framing
- data flow control
- data rate

Setup data can be permanently held in EEPROM even when the Series II *Plus* is powered off.

+ Speed

Featuring a Z80A processor, the Series II *Plus* is capable of data rates up to 19.2 Kbps or, with optional Z80B processor and DMA, up to 56 Kbps as well as concurrent operation of up to 8 input/output devices at equivalent rates!

+ Code Compliance

The Series II *Plus* converters meet the FCC emissions requirements and are designed to satisfy those requirements when included in subsystems. The Series II *Plus* is also UL and CSA listed.

+ Fluency

The Series II *Plus* provides fluent communications in IBM SNA and Bisync protocols including 3770, 3270, HASP and 2780/3780. All Series II *Plus* converters support a multitude of input and output devices and are available with up to 8 ports (3 in 2780/3780 converters). You can count on the Series II *Plus* for fluent IBM to ASCII communications.

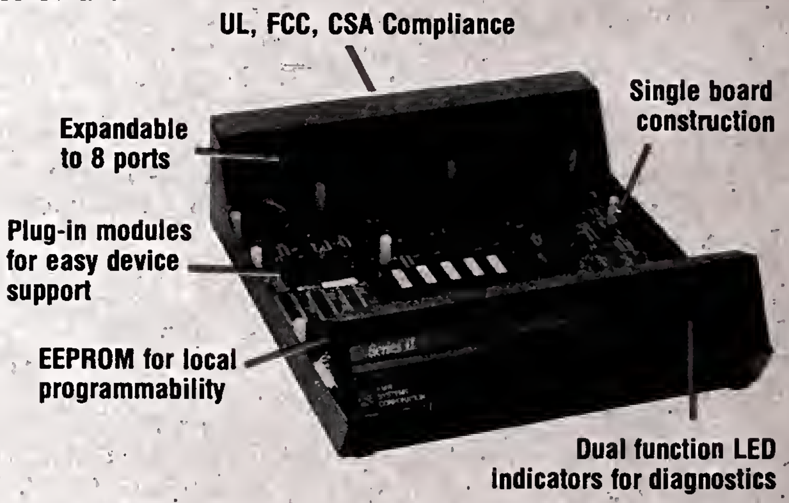
+ Hardware Design

Another Series II *Plus* advantage is the efficient hardware design of the unit. The sleek exterior lines give way to a plug-in modular interior which provides for maximum flexibility, a high degree of reliability and ease of maintenance. KMW's unique hardware design allows for a series of plug-in modules to provide device interfaces. Standard interface modules include Data Products 8 bit Parallel Printer interfaces, Documation Parallel Card Reader and RS-232 Serial General Purpose interfaces.

The reliability of the Series II *Plus* design is exemplified by an impressive mean time between failure of over 13,000 hours. That's a real plus.

With a mean time to repair of only 30 minutes, down time is always at a minimum.

The Series II *Plus* is engineered for performance and the proof is in the package.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Single board construction
Expandable to 8 ports
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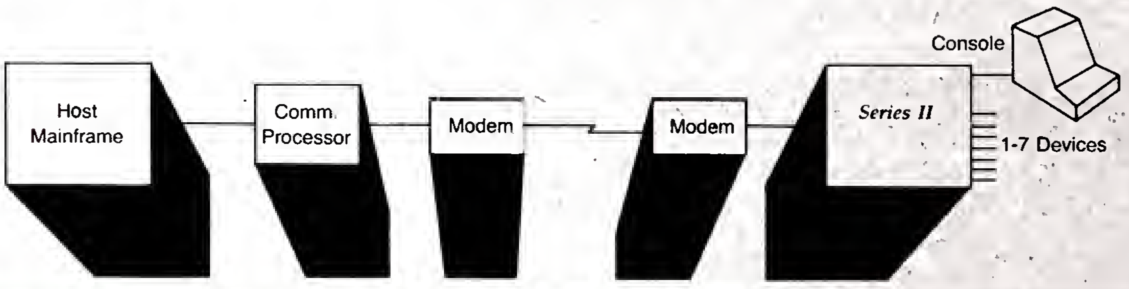
EEPROM for local programmability
Dual function LED indicators for diagnostics

A Special *Plus*

The Series II *Plus* is available in synchronous-to-synchronous configurations including 3770 to 2780/3780 or HASP to 2780/3780. If your applications require something special, check with KMW.

Add a little polish to your communication. The Series II *Plus* . . . Fluent communications from a polished performer.



KMW SYSTEMS CORPORATION

8307 Highway 71 West • Austin, Texas 78735 • 512/288-1453 • TWX: 910-874-2005 CABLE: KMWSYS
Call Toll Free 800/531-5167

CONTROL

from page 59

well as other large-scale processors.

Many countries are importing Japanese components and integrating them into computer systems. Scotland's so-called Silicon Glen is dotted with microcomputer manufacturing plants that buy up Japanese components and use cheap Scottish labor for assembly.

Burgeoning Industry

Israel has a burgeoning software industry. Taiwan is making chips. The list goes on, and it will continue to grow. If the Soviets want a VAX-level processor, they are going to get it, if not from an American manufacturer, then from a foreign source.

While the U.S. currently holds the top slot when it comes to technology, there is no guarantee it can keep those technologies under wraps.

Even if the current, outdated, U.S. export laws that forbid U.S. manufacturers from dealing with the Soviets are stiffened, other countries are sure to find the Soviet Union an extremely fertile market in which to sell electronics. After all, without the IBMs and DECs of the U.S. as competitors, selling hardware becomes a much easier task.

PLANNING

from page 59

cessfully from a disaster.

Gaining top-level, corporatewide support for a disaster recovery plan is probably the strongest guarantee for success.

Three basic steps

To do this, there are three basic steps that help define the overall impact of the DP operation on the rest of the company.

■ The first step is to evaluate thoroughly the costs and benefits of a contingency plan. This involves input from the DP department as well as from the users of the system.

■ Next, the DP executive must determine which applications are most critical to the firm's operation. This involves a priority analysis of applications, determining the operating requirements for each of the key applications.

This phase also includes an analysis of the risks and benefits of various recovery alternatives.

■ The last step involves the actual development of a contingency plan. This plan should be developed by the DP personnel so that they are familiar with its structure. The final step also involves testing the contingency plan to make sure it works and training personnel in how to cope with a disaster.

At the conclusion of each of these phases, an interim report of observations, findings and recommendations should be released to management for review and comments before proceeding to the next phase.

In this way, management involvement is maintained, and there is a higher potential for a workable contingency plan.

The main reason a contingency plan fails is because the firm chose a technical solution before adequately understanding the management requirements of the organization.

Somogyi is an information system services specialist with Ernst & Whinney, a Cleveland-based disaster recovery consulting firm.

TURNKEY SYSTEMS

AGENCY MANAGEMENT SYSTEMS, INC.
Turnkey management and marketing system

Agency Management Systems, Inc. (AMS) has announced a turnkey management and marketing system designed for independent insurance agents and brokers. The system is based on IBM's Personal Computer.

The AMS micro includes an IBM Personal Computer with 256K bytes of main memory, a 35M-byte hard disk drive, 60 char./sec letter-quality printer, streaming cassette tape drive for backup and a mouse. Software includes accounting, billing, client services, diary, word processing, query and marketing.

The software for the micro provides the marketing and management tools that the company offers in its IBM Series/1 minicomputer system.

The AMS micro costs approximately $16,000, the vendor said.

AMS, Suite 300, 150 Interstate N., Atlanta, Ga. 30339.

DATA STORAGE

QANTEX DIVISION OF NORTH ATLANTIC INDUSTRIES
Jetstream 16

A streaming cartridge tape system that can read and write as a 9- or 16-track tape drive and offers up to 99M bytes of storage is available from the Qantex Division of North Atlantic Industries.

Called the Jetstream 16, the unit is both QIC 02- and QIC 24-compatible and was designed as backup storage for Winchester disks in the 30M-byte range and higher. The unit is said to provide up to 80M bytes of formatted data on a standard data cartridge, in addition to reading and writing the standard 9-track, 45M-byte format. The system handles burst transfer rates of up to 400K bit/sec, the company said. An average transfer rate of 72K byte/sec is required to maintain streaming.

Other features of the microproces-

Continued on page 62

Need IBM 4300 back-up?
When you're planning for disaster recovery, plan on HOTSITE™ the fully-equipped, dedicated facility

NOW with 1419 and 3375's

Fully equipped with an IBM 4341 Group II Computer, tapes, disks, CRT's and communication equipment, HOTSITE can put your computer operations back in business in a matter of hours.

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And no back-up facility can serve your needs more thoroughly, more efficiently, more economically than HOTSITE, the fully-equipped IBM 4300 facility dedicated to disaster recovery. Centrally located in Niles, Ohio, HOTSITE has state-of-the-art hardware already in place and provides this unusual combination of benefits:

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This extraordinary package of services has been designed to provide you with the greatest possible protection and flexibility at the lowest possible cost. For instance, our pricing policy allows you to pay only for the size of system you need and can afford.

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Company ______
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City ______ State ______ Zip ______
Phone ______

Continued from page 61

sor-based Jetstream 16 include automatic reference burst location, automatic cartridge identification, error logging and diagnostic tests.

The Jetstream 16, including controller, costs $1,450 in single quantities, with OEM discounts available, the vendor said.

North Atlantic Industries, Qantex Division, 60 Plant Ave., Hauppauge, N.Y. 11788.

TARGA ELECTRONICS SYSTEMS, INC.

DR1101 data recorder Solidrive FDE425 CH40 holder/interface

Targa Electronics Systems, Inc. has announced a line of industrial bubble memory data storage systems designed for moderately rugged plant and factory environments.

Available in sealed, removable cartridges of 128K bytes or 256K bytes, the memory systems were designed for industrial and laboratory data acquisition and process control applications, the vendor said.

The DR1101 data recorder is a self-contained, benchtop device with various interface and software protocol options. The unit includes an RS-232C or IEEE 488 communications port with software implemented to emulate a Digital Equipment Corp. TU-58 cartridge tape recorder or a Hewlett-Packard Co. HP 82902 floppy disk drive.

The Solidrive FDE425 is a floppy disk emulator that is electronically compatible with Ansi standard drives and fits a 5¼-in. footprint. The unit can be changed from one standard format to another, the vendor said.

The CH40 OEM holder/interface subassembly series was designed for manufacturers of such equipment as portable computers, control systems and geophysical instruments.

It is available with serial or parallel communications and simple software protocols, the vendor said.

Single-unit prices for 128K-byte versions of the Targa systems are $2,995 for the DR1101 data recorder, $2,495 for the FDE425 floppy disk emulator and $1,795 for the CH40 holder/interface, according to the company.

Targa Electronics Systems, P.O. Box 8485, 3101B Hawthorne Road, Ottawa, Canada K1G 3H9.

ROTHCHILD CONSULTANTS

Optical Memory Report

Rothchild Consultants has announced that it will publish an annual report, with periodic updates, on developments in the field of optical disk drives, optical media and digital read-only disk drives.

The "Optical Memory Report" will provide manufacturers, users and venture capitalists with information about product specifications, vendors, OEM and user prices and market forecasts.

The first edition is scheduled to be published in the spring of 1984 at a cost of $1,995. It can be purchased at a discounted prepublication price of $1,495 if payment is received before April 1, according to the vendor.

Rothchild Consultants, P.O. Box 14817, San Francisco, Calif. 94114.

FUJITSU AMERICA, INC.

M2333; M2330AT; M2333AT

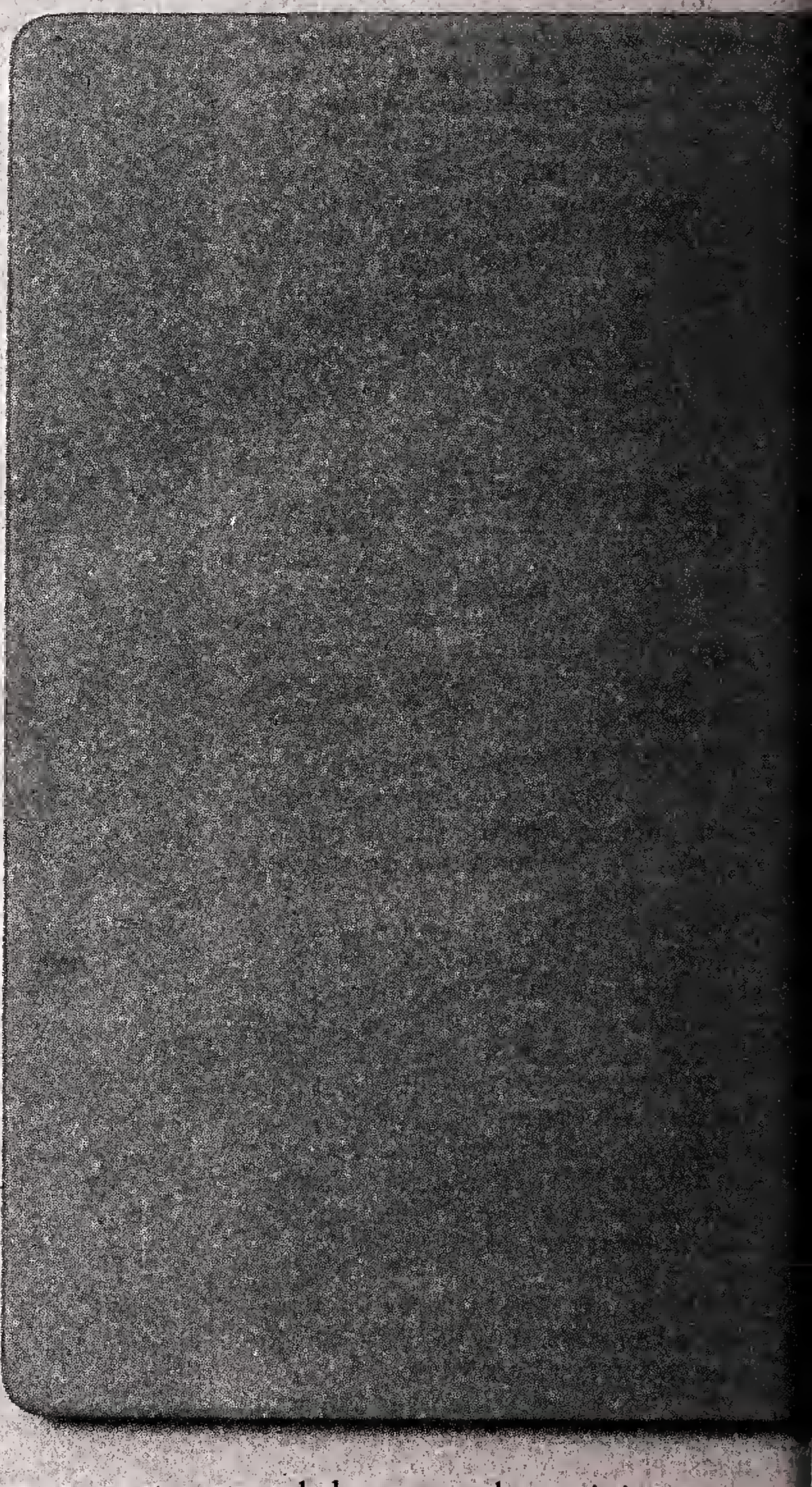
Fujitsu America, Inc. has announced an 8-in. Winchester disk drive and two half-high, 5¼-in. rigid disk drives.

The 8-in. drive, the M2333, reportedly offers 337M bytes of unformatted storage in a package that measures 5 in. by 8½ in. by 15 in.

A pair of the drives reportedly can be installed side by side in a standard 19-in. rack to provide 674M bytes of storage. The drive is said to feature an average positioning time of 20 msec, and a data transfer rate of 2.4M bit/sec with a storage module drive plus interface, according to the vendor.

Evaluation units reportedly will be available in August with production delivery scheduled for November at a price of $5,500 in quantities of 100.

The 5¼-in., half-height drive, the M2330AT, reportedly offers 6.6M bytes of



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The most important program we've ever written.

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A package of innovative options that lets you pick and choose exactly what level and what kind of service and support you need — designed specifically for your business, corporation or profession.

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This partnership with RCA makes Apple On-Site one of the most experienced service networks in the business.

And just one easy-to-budget-for annual fee covers everything. There are no zone charges, no warranty or travel charges, and no minimum quantities. So you can get on-site service whether you have one Apple or one thousand.

LISA GETS LOTS OF ATTENTION.

The same toll-free number mentioned above puts users of the Lisa™ Personal Office Systems in touch with specially trained Lisa experts who can answer application-related questions during the warranty period.

You can also get special application training on the Lisa. Courses follow a hands-on, self-paced format, and are taught by certified Apple trainers.

Both basic and advanced courses are available, either at your office or at selected Apple sites.

SYSTEMS AND PERIPHERALS

storage, and the M2233AT, 13.3M bytes of storage. Both drives are 1.62 in. high, and have Seagate Technology, Inc. ST506/412 compatibility.

In quantities of 100, the M2230AT drives are priced at $750 each, and the M2233AT at $850, according to the vendor. Evaluation units reportedly will be available during the first quarter of 1984.

Fujitsu, 3075 Oakmead Village Drive, Santa Clara, Calif. 95051.

COMPUTER STORAGE TECHNOLOGY, INC.

CS-100; TS-100

Computer Storage Technology, Inc., (CST) has announced a streaming tape subsystem for backup storage and an on-line operational magnetic tape subsystem for the IBM Series/1 minicomputer.

The CS-100 streaming tape subsystem provides up to 55M bytes of backup storage for large capacity Winchester disk drives, according to CST.

It reportedly uses the firm's CC-100 peripheral processor and a ¼-in. cartridge tape streamer based on the QIC-02 cartridge used by Archive Corp. Sidewinder or Cipher Data Products, Inc. Quarterback tape drives.

The tape subsystem can be mounted in a standard 19-in. rack, with no need for a software driver, diagnostic changes or controls, other than a power switch, according to a spokesman for the vendor.

The firm's TS-100 tape subsystem consists of a TC-100 peripheral processor, a universal users' adapter and up to four tape transports, the spokesman said.

It is said to be compatible with tape speeds from 12.5 in./sec to 125 in./sec.

It reportedly features switch-selectable address and density selection with quartz crystal generated timing in order to eliminate the need for controller adjustments.

Both subsystems are available 30 days after receipt of order, according to the spokesman.

The CS-100 costs $4,970. The price of the TS-100 depends upon the tape drive selected, ranging from $10,100 using the Kennedy Co. 9000 drive to $12,300 using the Kennedy 9300, according to the vendor.

Computer Storage Technology, 1369 S. State College Blvd., Anaheim, Calif. 92806.

TERMINALS

BARRISTER INFORMATION SYSTEMS CORP.

Attorney Workstation/Telephone

A combination computer workstation and telephone designed for lawyers and professionals is being offered by Barrister Information Systems Corp. for use with the Barrister Law Office Information System.

Comprised of a Northern Telecom, Inc. Displayphone, the Attorney Workstation/Telephone functions as a terminal on the Barrister system and as a telephone with special executive features, according to a spokesman for the vendor.

With the Displayphone, the attorney can inquire into the Barrister litigation support, information management and financial management data bases, as well as public information sources such as Dow Jones News Retrieval Service, *The New York Times*, Lockheed Dialog and Westlaw, the vendor spokesman said.

The system performs docketing functions and has a reminder service for key meetings that holds up to 58 entries one year in advance, the vendor said.

The Attorney Workstation reportedly features a 7-in. video display terminal, a retractable keyboard and a directory that stores as many as 81 numbers for automatic dialing.

The Displayphone is portable and can communicate to the Barrister system from any location through telephone lines, according to the vendor.

The Attorney Workstation/Telephone is priced at $1,995.

Barrister Information Systems, 45 Oak St., Buffalo, N.Y. 14203.

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SYSTEMS AND PERIPHERALS

SYSCON CORP.
Versaterm

Syscon Corp. has announced a hand-held terminal with 64K bytes of programmable memory for data gathering applications.

According to a company spokesman, the Versaterm terminal weighs 1 lb and measures 3½-in. by 7-in. by 1½-in. It reportedly features 32 keys, including a shift key, for a total of 63 functions. A 2-line by 32-char. LCD, low-power microprocessor and rechargeable battery are also included.

The terminal can be programmed for a variety of tasks, such as collecting meter readings, gathering inventory of patient information, recording data for laboratory experiments, monitoring industrial processes and monitoring and scheduling maintenance, the spokesman said. Data reportedly can be loaded and unloaded from a variety of host computers through an interface and a battery-charging device that can accommodate eight terminals, the vendor said.

The terminal is available for $3,000, and the interface device is available for $6,000.

Syscon, 3990 Sherman St., San Diego, Calif. 92210.

HEWLETT-PACKARD CO.
HP 78532A

Hewlett-Packard Co. has announced an addition to its bedside patient monitoring family, the HP 78532A monitor/terminal.

Compatible with all HP medical equipment, the bedside terminal was designed to be an integral part of the HP Care-Net critical care local-area network.

Standard measurements on the terminal/monitor include full-lead electrocardiogram, two pressures and one- and eight-hour trends. The expandable 16-bit microprocessor allows field-upgradable enhancements such as the cardiac output module, which provides cardiac output and blood temperature measurements, the vendor said.

The HP 78532A has an overview feature which allows the user to access the waveforms, vital signs and alarm messages of up to 24 patients. Overview is initiated manually or automatically during an alarm condition from another bed, the vendor said.

Buttons on the instrument panel provide access to critical or frequently performed tasks. A row of user-changeable function keys labeled on the video screen are for less critical functions. In addition, bedside information can be displayed in a variety of formats, the vendor said.

The HP 78532A monitor/terminal is priced at $7,540.

Hewlett-Packard, Medical Products Group, 100 Fifth Ave., Waltham, Mass. 02254.

HEWLETT-PACKARD CO.
Matrix and Line Printers

Hewlett-Packard Co. has announced four printers including three matrix printers and a system line printer that operates at 300 line/min.

The HP 2930 family of three character-sequential printers operates at 200 char./sec. Included in the family are a general-purpose printer and a remote workstation printer that can produce bar code and a letter-quality printer for business, technical, manufacturing or personal printing, the vendor said.

The unit's print head uses 12 wires arranged in two staggered columns. A last-form tear-off feature makes it possible to remove the last printed sheet of continuous paper without wasting a blank sheet, the company noted.

Users may choose 5, 10 or 16.36 char./in. printing and both serif and sans-serif fonts. Line drawing, math symbols and character sets in 10 languages are also standard.

Included in the HP 2930 family is the HP 2932A printer, which was designed for distributed printing applications. For data capture applications, the HP 2933A factory data printer features large-character generation and bar-code printing in several formats. The HP 2934A distributed office printer, designed for business and personal use, offers either a 40 or a 67 char./sec matrix, letter-quality print and 200 char./sec memo-quality printing.

All three printers are supported by the HP 150 and 200 personal computers, the HP 1000 and 9000 technical computers and the HP 250 and 3000 business computers. With RS-232C and Centronics Data Computer Corp. parallel interfaces, the printers are also compatible with many other systems.

The HP Series 300 Model 2563A system line printer provides 300 line/min printing for many types of business uses. Featuring compressed print, mulitnational and optical character recognition character sets, raster graphics and bar codes, the HP 2563A has noise-reduction features as well as paper-jam detection.

The line printer can link to HP 3000, 250 and 1000 computer systems through the HP Interface Bus and to a number of other systems through Centronics and Dataproducts New England, Inc. interfaces.

The HP 2932A, 2933A and 2934A matrix printers are priced at $2,495, $2,795 and $2,895, respectively. Replacement print heads are $140. The HP Series 300 Model 2563A line printer is $5,780, including power supply. OEM discounts are available.

Hewlett-Packard, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

High resolution, low cost graphics should be more than a retrothought.

Why settle for a low resolution retrofit graphics terminal when you can have a VISUAL high resolution terminal with quality and reliability built in. And at a cost that makes retrofits overpriced.

The VISUAL 500 and VISUAL 550 emulate the Tektronix* 4010/4014 but cost only about half as much. And they provide 585(V) x 768(H) resolution for sharp text and graphic display on a large 14" screen without the need to add boards or change the CRT. This superior resolution offers the ideal vertical to horizontal dot density ratio of 1:1 for balanced images and reduces the "stairstep" effect you get with most retrothoughts.

The VISUAL 500 provides selectable emulations of the DEC VT52,* Data General D200, Lear Siegler ADM3A,* and Hazeltine 1500 terminals. The VISUAL 550 is DEC VT100* protocol-compatible as well as a character or block mode terminal which complies to the ANSI X3.64 standard.

Call or write for a free comprehensive reference booklet on graphics terminals including a glossary of graphics buzzwords.

VISUAL See for yourself

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VISUAL 500/550

	VISUAL		RETROTHOUGHTS						
			DIGITAL ENGINEERING				SELANAR		
	500	550	VT640S	VT640	DQ650S	DQ650M	SG100 PLUS	SG200	SG480
Vertical Resolution	585	585	240	480	240	480	240	240	480
Horizontal Resolution	768	768	640	640	800	800	1225	1225	780
Dot Density Ratio	1:1	1:1	1:2	1:1	1:3	1:1	1:4	1:4	1:1
Screen Size	14"	14"	12"	12"	12"	12"	12"	12"	12"
Tektronix 4014 Compatible	STD	STD	NO	NO	NO	STD	NO	STD	STD
Data Tablet Support	STD	STD	NO	NO	OPT	OPT	NO	NO	NO
Multi-Vendor Printer Support	STD	STD	OPT	OPT	OPT	OPT	OPT	OPT	OPT
8 Dir. Cross Hair Cursor	STD	STD	NO	NO	NO	NO	OPT	OPT	OPT
Programmable Function Keys	STD	STD	NO	NO	NO	NO	NO	NO	NO
Tilt/Swivel Enclosure	STD	STD	NO	NO	NO	NO	NO	NO	NO
Compatibility	VT52 ADM3A H1500 D200	VT100 VT52 ANSI X3.64	VT100 VT52	VT100 VT52	VT100 VT52	VT100 VT52	VT100 VT52	VT100 VT52	VT100 VT52
PRICE (suggested list*)	$2,495	2,695	3,025	3,355	3,025	3,510	2,890	3,390	3,190

Retrothoughts price includes DEC VT100 terminal based on published information as of 4/1/83.

MICROCOMPUTERS

The education of managers: getting them to use micros

By Anthony J. Paoni
Special to CW‡

First of a Two-Part Series

"What are those typewriter-televisions anyway?" is the question on the cover of Peter McWilliams' best-seller, *The Personal Computer Book*. What are they indeed. As businessmen all over the country hoped for a happy and prosperous 1983 to greet them last January, they were served a giant literary bromo as *Time* magazine named the personal computer "Machine of the Year."

Then just before the first-quarter numbers were being tallied and management had finally read the last chapter of Thomas J. Peters' and Robert H. Waterman Jr.'s *In Search of Excellence*, managers got another literary barrage. This time it was *Business Week's* turn: "The personal computer explosion is changing the organizational structure of companies as well as the function of managers."

The siege continued with headlines proclaiming "Chip Wars" and "Computer Shock." Amid this ever-increasing public computermania appeared the confident, almost smiling face of IBM Chairman John Opel on the cover of *Time* with the IBM logo in the background and the title "The Colossus That Works.". The smile was probably due to IBM's record personal computer sales.

Uneducated on personal computer

It seems that these typewriter-televisions are everywhere. Yet most management personnel are uneducated on the personal computer, which has found its way into offices, small businesses, classrooms and homes.

There is a need for education on the use of personal computers in corporate business operations. "Not here," many managers say. "I conducted a personal computer session with my company's management. We brought them in for a demonstration, and [the managers] asked questions and seemed interested."

If that was education, the elementary school year could be shortened to one day by bringing in the students, working some math problems on the board, reading a short story aloud and discussing the significance of the Fourth of July. Clearly, that kind of brief exposure cannot be deemed sufficient education.

Picture an organization about to receive a powerful new method of processing one of its vital assets. The management would expect an in-depth review of the background of this new process, a review of its proven capabilities, examples of its use in other organizations and a brief conceptual review of how it functions.

There should be no difference in approach to the introduction of the concept of utilizing personal computers in corporate business operations. Information is certainly a vital asset of an organization and, therefore, the personal computer deserves the status of a powerful new method of processing. Typically, the management information systems function within an organization has the responsibility to encourage the proper use of personal computers and control the potential misuse of this new technology.

There are three parts to an educational seminar: format, content and delivery. Often, participants concentrate on the content of a seminar and either ignore until the last minute or spend very little time on the other two-thirds of the requirements of a successful seminar.

The audience for a management seminar on personal computers will require that the developer keep in mind the group's level of computer literacy, current perception of the personal computer and the main focus of the seminar.

A central theme for this kind of educational seminar should be to leave the participants with an understanding of what a personal computer can do, not how a personal computer works. Concept-oriented, nontechnical meetings of this kind have proven successful in introducing the personal computer in hundreds of organizational structures.

Computer literacy

Management education should include some computer literacy on the trends within the information industry and how the combination of the information center and the personal computer is making this step forward possible.

It is hard to dispute the astronomical success of personal computers which, according to an International Data Corp. projection, will surpass mainframes in 1987 in terms of dollar volume.

An explanation of the use of the personal computer as a management productivity tool is an excellent vehicle to stimulate the audience's interest in what functions it performs. New York-based Booz, Allen & Hamilton, Inc.'s study on knowledge workers — defined as management and nonmanagement professionals — is a revealing description of the highly interrelated work functions of this critical group of workers.

Next in the seminar should be a section focusing on the types of organizations that use personal computers as management productivity tools and the functions they perform.

Success stories

The data processing and non-data-processing publications are filled with success stories about time-saving management uses of personal computers. Best-selling books on the subjects of successful management and worldwide economic trends can provide plenty of material for this section.

Senior management of organizations that have made the commitment to use personal computers will likely say that they are preparing for the shift to a more service-oriented economy. The personal computer will assist their organizations in dealing with the need for timely information, which will be a requirement to perform efficiently and to compete effectively.

Computer technology will soon be used as a competitive weapon to fight the competition and to play a strategic role in the success of organizations. The best person to deliver this section is a member of a management team from an organization that successfully uses personal computers.

Paoni is president of Personal Computer Management, Inc. of Wheaton, Ill., a consulting firm that provides seminars on personal computers for managers.

Next week: software, modeling and graphics.

DEC unveils more software

MAYNARD, Mass. — A version of the P/OS operating system is among a series of software products announced recently by Digital Equipment Corp. for its Professional 300 series of microcomputers.

P/OS Version 1.7 includes performance and function enhancements, DEC said. It was designed to take advantage of increased memory and floating-point processing capabilities that are standard on all Professional systems. Its license is included in the system price. Media and documentation are sold separately for $175.

DEC's PRO/V7M is a complete Unix system for the Professional 300 series. It costs $695. RT-11 is DEC's single-user, real-time operating system designed to be operated on DEC's PDP-11 series, including the Professional 300. The single-user price is $700.

Softech Microsystems, Inc.'s UCSD P-system Version IV.I can now be installed as an application on P/OS to provide a portable application software environment. It can be written in UCSD Pascal and Fortran 77. The price ranges from $250 to $975.

The PRO/Tool Kit was designed for use on the Professional 350. It is said to eliminate the need for a host system in Professional applications development and offers DEC RSX and VMS program development capabilities on the Professional 350. Licenses range from $295 to $495. The Professional Host Tool Kit Version 1.7 is an enhancement that provides improved performance and supports

See **P/OS** page 66

Apple enhances Apple III system

CUPERTINO, Calif. — Apple Computer, Inc. has announced an enhanced version of its Apple III business computer system and an electronic information service for Apple III owners.

The Apple III Plus system reportedly features an interlace video mode, which is said to double screen resolution of text and graphics, a clock/calendar function, an Apple IIe-style keyboard, revisions in the operating system and a reengineered main logic board.

The interlace video mode is said to scan both normal lines and between normal lines, giving the appearance of solid lines instead of dots. The clock/calendar function reportedly allows date and time stamps on files and tracking of sequences of events.

The keyboard reportedly is identical to the Apple IIe keyboard, featuring repositioned cursor control keys, a delete key and a choice of either Qwerty or Dvorak key layouts.

Revisions of the Sophisticated Operating System (SOS) 1.3 and system utilities are intended to support hardware changes that are said to include redesigned four-

See **APPLE** page 66

INSIDE

- Another Apple IIe compatible debuts from Multitech Industrial Corp./**66**
- BASF brings out a 3½- and 5¼-In. Floppy Disk; Three Companies Introduce Winchester Hard Disks/**67**
- The PC Express Communications Package for the IBM Personal Computer Now Works with IBM's SNA/**70**
- Apple II users get a CP/M card that includes word processing, spread sheet and list management software bundled in/**70**
- Doctors, graphic designers and engineers can use a light pen to create graphics on the IBM PC/**70**

P/OS

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new languages and compilers, the spokesman said. It licenses for $4,000.

The Whitesmiths Ltd. C Compiler for the PRO/Tool Kit and the Professional Host Tool Kit supports the full C language and offers a library of support functions. It costs $550 for the PRO/Tool Kit and $1,100 for the Professional Host Tool Kit.

Application packages that are available include: PRO/Applications Starter Kit, an integrated package of business applications for computer novices, priced at $399; PRO/Datatrieve, an implementation of DEC's Datatrieve-11 interactive data management system for the Professional 350, priced at $495; Professional Inter-System Management, which enables a Professional under P/OS 1.7 to communicate directly with IBM mainframes, priced at $595; and RS/I, a new version of Bolt Barenek and Newman, Inc.'s RS/1 Research System for stand-alone use on Professional 350s with hard disks and color monitors, priced at $1,900.

Other applications include: Maps/PRO Graphics, a business graphics system for the Professional 350 developed by Ross Systems, Inc., priced at $200; Mechanical Engineering TK! Solverpack, one of a series of applications packages used with Software Arts, Inc.'s TK! Solver that contains 13 general models for mechanical engineering, priced at $299 for TK! Solver, $100 for Mechanical Engineering TK! Solverpack and $100 for TK! Financial Solverpack; and Universal Microprocessor Development system from Boston Systems Office, an integrated development system that is compatible with more than 30 microprocessors. It is priced from $1,000 to $3,000.

Hardware announcements include a Real-Time Interface module option, which includes four I/O ports, allowing the Professional to communicate with and control passive data capture devices. It is priced at $595. Computing Terminal Interconnect licensing is no-charge licensing of the Professional's bus for third-party hardware vendors.

DEC, Maynard, Mass. 01754.

APPLE

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layer main logic board, peripheral ports on the back panel that use standard DB-25-pin connectors and modified slot housings for easier insertion of peripheral cards.

The Apple III+ system is now available for a suggested retail price of $2,995.

Apple Serve III is an electronic information service for owners of the systems.

Apple Serve III is said to feature an electronic mail connection among Apple III owners; a bulletin board for exchanging hardware and software tips; referrals and meeting information; an electronic newsletter produced by Apple; and information on software updates and directions for obtaining them.

The service is provided through the Compuserve, Inc. network. A modem and a telecommunications software package are required.

The service is available now for free, although, Apple said, there may be a charge at a later date.

Apple Computer, 10260 Bandley Drive, Cupertino, Calif. 95014.

SYSTEMS

WINTERHALTER, INC.
Datatalker II

Winterhalter, Inc. has introduced the Datatalker II, an intelligent front-end processor which allows most popular microcomputers to access IBM and IBM-compatible mainframes and other communications networks.

The product is said to plug into a micro's RS-232 serial port. Using several software packages included with the product, the Datatalker II allows a microcomputer to emulate several different remote batch and interactive IBM terminal systems.

The software, currently available for micros running on Digital Research, Inc.'s CP/M, CP/M 86 and Concurrent CP/M 86 and Microsoft Inc.'s MS-DOS operating systems, reportedly allows the connected system to emulate the IBM 3271, 3275 and 3276 interactive terminals and the IBM 3780, 2780, 3741, 2968 and 2770 remote batch terminals.

The unit costs $995.

Winterhalter, 3853 Research Park Drive, Ann Arbor, Mich. 48106.

MULTITECH INDUSTRIAL CORP.
Microprofessor MPF-III

Multitech Industrial Corp. has introduced the Microprofessor MPF-III, a microcomputer said to be compatible with the Apple Computer, Inc. Apple IIe.

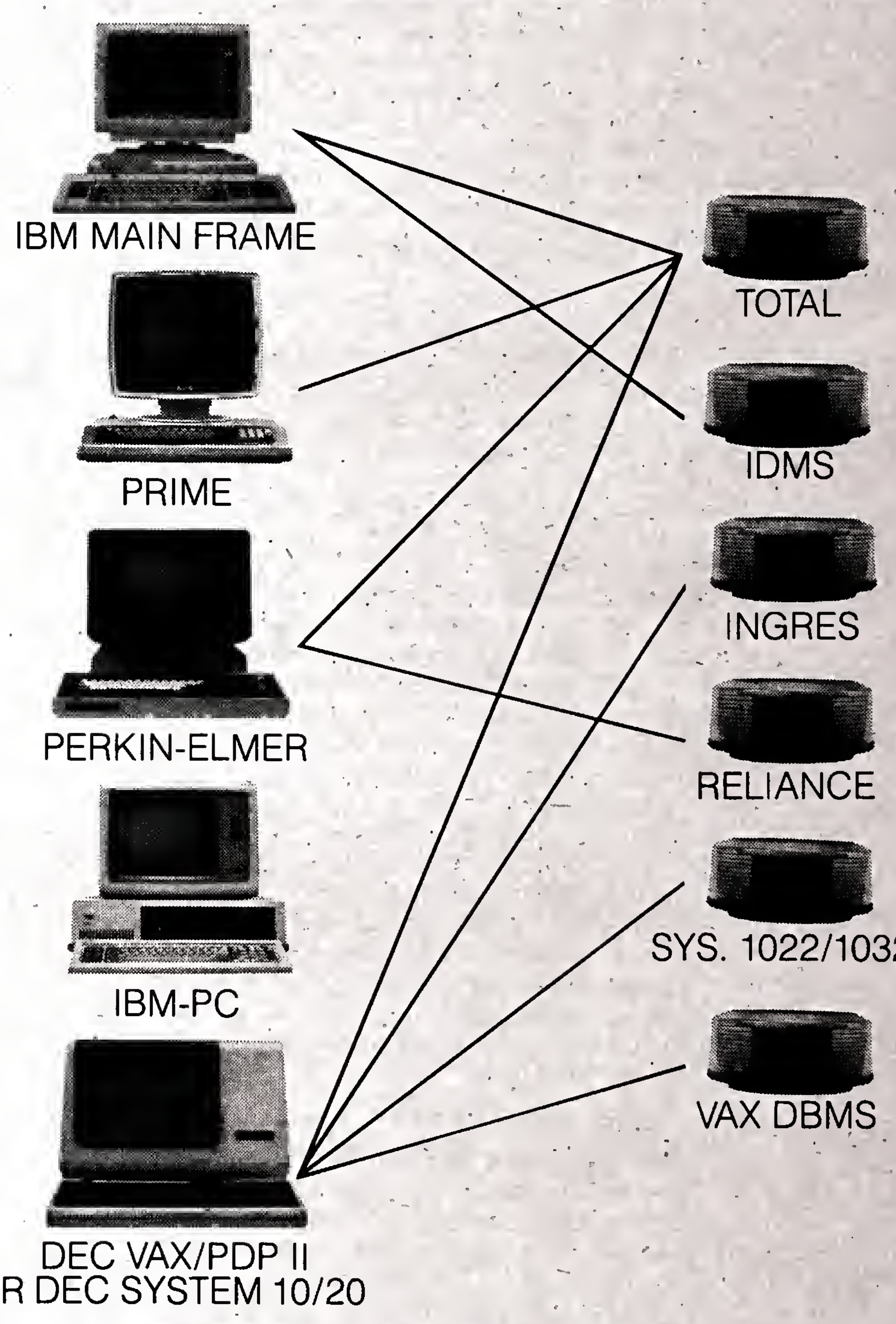
The MPF-III features 66K bytes of random-access memory (RAM) and 24K bytes of read-only memory. The vendor said 2K bytes of RAM function as a text buffer for an 80-col. screen feature.

Several standard expansion capabilities are available on the MPF-III including two monitors, cassette unit, a Centronics Data Computer Corp. printer and joystick interface. Optional expansion features include a floppy disk, RS-232C interface, a Zilog, Inc. Z80 microprocessor, Digital Research, Inc.'s CP/M and a Chinese character generation card.

The MPF-III comes with a 90-key detachable keyboard, the vendor said.

The unit costs $599.

Multitech Industrial, 315 Fu Hsing N. Road, Taipei 104, Taiwan, ROC.



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Seed Software, 2300 Walnut Street, Suite 734, Philadelphia, PA 19103.

MICROCOMPUTERS

ONYX SYSTEMS, INC.
Price reductions

Onyx Systems, Inc. has reduced prices by up to 12% on several of its 8-bit microcomputer models. Price reductions range from $240 to $1,210 on the Onyx Sundance, C5001 and C8001 series processors.

With these reductions, the price of a Sundance II incorporating an 80-col. Digital Equipment Corp. VT100-type video display terminal, 192K bytes of random-access memory (RAM), a 7M-byte Winchester disk drive and tape backup is $7,250. The maximum configuration of the Sundance II, with 132-col. display, 192K bytes of RAM, a 21M-byte disk drive and tape backup, is priced at $9,750.

The price of the C5001A now ranges from $5,990 to $7,990. These systems include 192K bytes of RAM, tape cartridge backup and a choice of 7M-, 14M- or 21M-byte disk drives. The C5001/MU, which features 256K bytes of RAM and a 14M- or 21M-byte disk, begins at $7,990.

The C8001/MU begins at $10,990, supports five users and has 256K bytes of RAM and a 20M-byte disk.

Onyx Systems, 25 E. Trimble Road, San Jose, Calif. 95131.

STORAGE

QUALITY COMPUTER SERVICES, INC.
Bev, Big Blue

Quality Computer Services, Inc. has announced a 10M-byte, fixed, 5¼-in. Winchester hard disk subsystem said to offer an average data transfer rate of 5M bit/sec, an average latency time of 8.33 msec and a track-to-track seek time of 3 msec. The subsystem, Bev, is part of the vendor's family of 10M- to 84M-byte, 5¼-in. Winchester hard disk subsystems.

Also offered is Big Blue, a single-slot card said to run Digital Research, Inc. CP/M 80 programs on the IBM Personal Computer and the Compaq Computer Corp. Compaq without CP/M. Included with Big Blue are a Zilog, Inc. Z80B microprocessor; 64K-byte random-access memory; parallel and serial ports; serial cable; real-time clock; and hard disk interface. Bev costs $1,999 and Big Blue costs $595, the vendor said.

Quality Computer Services, 3 Quces Drive, Metuchen, N.J. 08840.

SEAGATE TECHNOLOGY, INC.
ST8100

Seagate Technology, Inc. has announced an 8-in. Winchester disk drive, reportedly designed for multiuser networking, graphics and shared-resource systems based on desktop supermicrocomputers.

The half-height ST8100 is said to feature reduced access time, 102.1M bytes of unformatted storage and a transfer rate of 10M bit/sec. The average access time reportedly is 30 msec, the vendor said.

Evaluation versions of the drive cost approximately $1,500. They are scheduled to be available in the second quarter of 1984, the vendor said.

Seagate, 920 Disc Drive, Scotts Valley, Calif. 95066.

BASF SYSTEMS CORP.
Storage media

BASF Systems Corp. has announced two media products, a 3½-in. micro diskette and a high-density 5¼-in. floppy disk.

The 3½-in. diskette has storage capacity of .5M bytes per side. The 5¼-in. floppy disk has a storage capacity of up to 1.6M bytes, the vendor said.

The price is $7.50 each for the 3½-in. diskettes and $10.00 each for the 5¼-in. floppy disks. These products will be available in the first quarter of 1984, according to the vendor.

BASF Systems, Crosby Drive, Bedford, Mass. 01730.

EICON RESEARCH LTD.
Discache

Eicon Research Ltd. has announced a Winchester disk subsystem for personal computers, reportedly featuring the ability to make frequently used data immediately available from a random-access memory (RAM) cache rather than from a disk.

The Discache subsystem is said to offer 10M- or 20M-byte formatted storage, a 256K-byte RAM cache memory, a microcomputer and an incremental backup system.

The product is available now at a suggested retail price of $3,000.

Eicon Research, 2157 Park Blvd., Box 60456, Palo Alto, Calif. 94306.

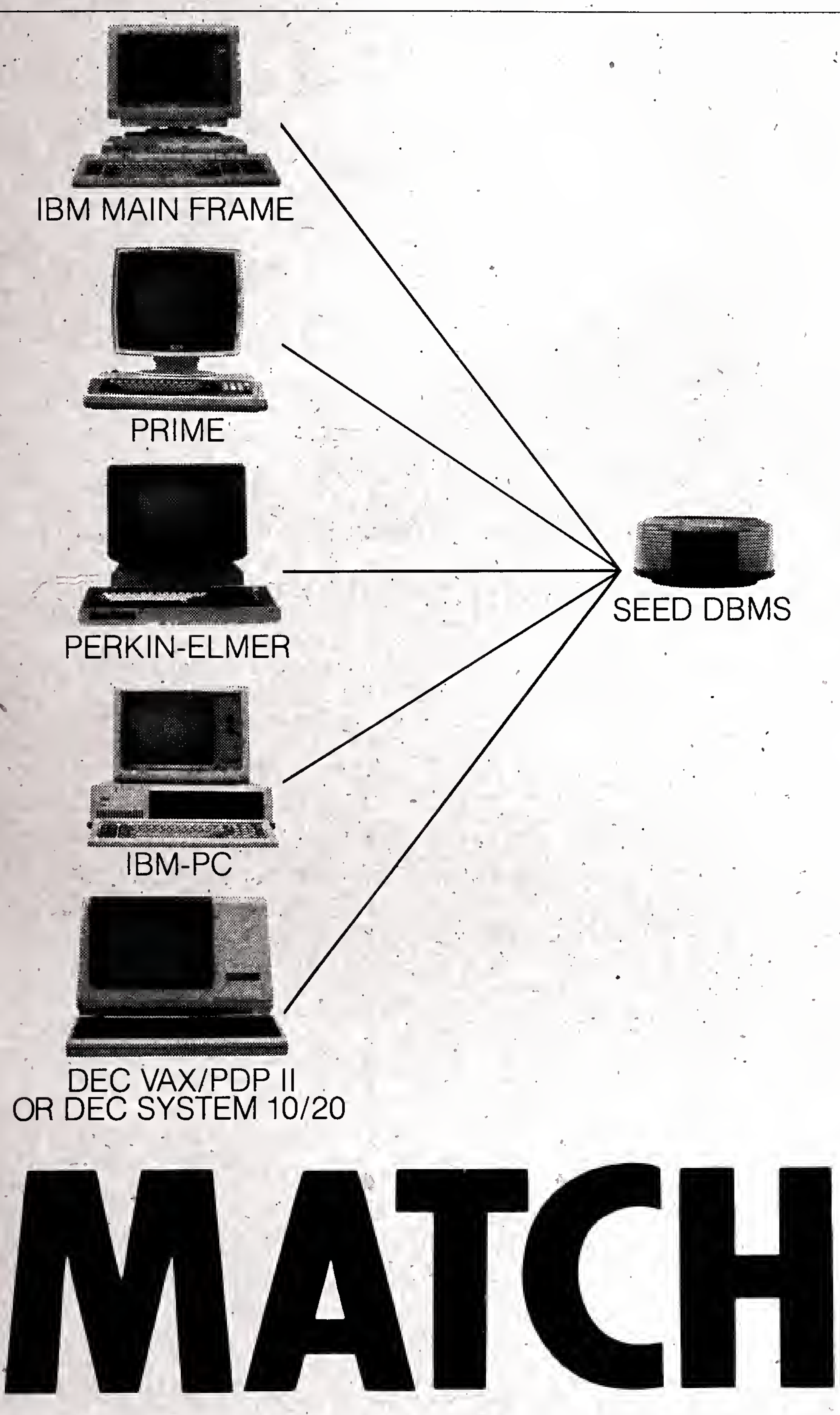
PRINTERS/PLOTTERS PERIPHERALS

COMPUTER STORAGE TECHNOLOGY, INC.
Model CS-400

Computer Storage Technology, Inc. (CST) has announced a microprogrammed magnetic-tape peripheral processor said to meet IEEE 696 standards for S-100 bus compatibility.

The Model CS-400 reportedly can record up to 55M bytes of data on a single ¼-in. cartridge and is capable of transferring data to tape at the speed of a streaming tape drive. The subsystem is comprised of a CST Model CC-400 single printed-circuit board peripheral processor, an Intel Corp. 8237 direct memory access (DMA) controller, a Zilog, Inc.

Continued on page 69



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UNITED INFORMATION
SERVICES, INC.
SEED SOFTWARE, 2300 Walnut Street, Suite 734, Philadelphia, PA 19103

The right equipment in the right place is not enough.

Get the facts on training in Computerworld Office Automation this February.

This February, *Computerworld Office Automation* will give you a close look at a whole range of training methods to help you choose what's right for your users: traditional training classes, computer-aided instruction, vendor instruction, on- or off-site training—and lots more. We'll also include a survey of different methods users have tried—and the results.

You'll read about one user's experience implementing an electronic mail system and accounts of how four different types of OA managers are coping in a multi-vendor environment. In addition, you'll get the results of a reader survey on the difficulties in hiring qualified office automation staff so you'll know what to expect.

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If you've got office automation products our readers should know about, then you need to get your ad reservation in by January 6th. The materials are due one week later on January 13th. To reserve ad space in this February 15th issue of *Computerworld Office Automation*, call one of the sales offices listed below, or Ed Marecki, National Sales Director at 617-879-0700.

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Continued from page 67

Z8038 peripheral processor for data transfer and a ¼-in. cartridge tape streamer based on the Qic-02 cartridge interface from Archive, Inc., the vendor said.

The peripheral processor is embedded in one slot of the S-100 host computer, while the streaming cartridge tape drive and power supply are contained in a tabletop chassis.

A basic CS-400 is available as a 45M-byte system (extendable to 55M bytes) with a full 29-bit DMA transfer capability and features 16-level DMA request arbitration along with 8- or 16-bit I/O address decoding, the vendor said.

A menu-driven software program provides use of Digital Research, Inc.'s CP/M and MP/M operating systems, the vendor said.

The price for a single subsystem is $2,995.

CST, 1369 S. State College Blvd., Anaheim, Calif. 92806.

ALPHACOM, INC.
Alphacom 42

Alphacom, Inc. has announced a price cut for its 40-col. home computer printer.

The Alphacom 42 universal printer, which reportedly uses a single-chip microprocessor and thermal technology, is said to operate at 2 line/sec and to feature bit-mapped graphics.

The unit is now priced at $79, plus $20 for an interface for most systems, according to the company.

Alphacom, 2323 S. Bascom Ave., Campbell, Calif. 95008.

BOARD-LEVEL DEVICES

ATRON CORP.
PC Probe

A hardware and software debugging tool for program development on the IBM Personal Computer and compatible systems has been introduced by Atron Corp.

Called the PC Probe, the device consists of a printed-circuit card that fits into any Personal Computer card slot, an umbilical cable and probe that plugs into the Personal Computer's 8088 integrated circuit socket and debugging software on a floppy diskette.

Designed for all standard high-level personal computer languages, including Macro Assembler, Pascal Compiler, Fortran Compiler and C Compiler, the PC Probe reportedly contains support for debugging both hardware and software.

Since it can access all Personal Computer bus signals as well as the 8088 CPU, Atron's tool can monitor and trap on interrupts and direct memory access requests as well as on standard CPU operations, the company noted.

Other features of the PC Probe include symbolic debugging capability, program patching, macro commands and program crash recovery, the vendor said.

The PC Probe sells for $2,195 in single quantities, with multiple quantity discounts available.

An optional eight-channel test clip cable costs $100, the vendor said.

Atron, 21075 Bank Mill Lane, Saratoga, Calif. 95070.

TEXPRINT, INC.
Print-It Model 2

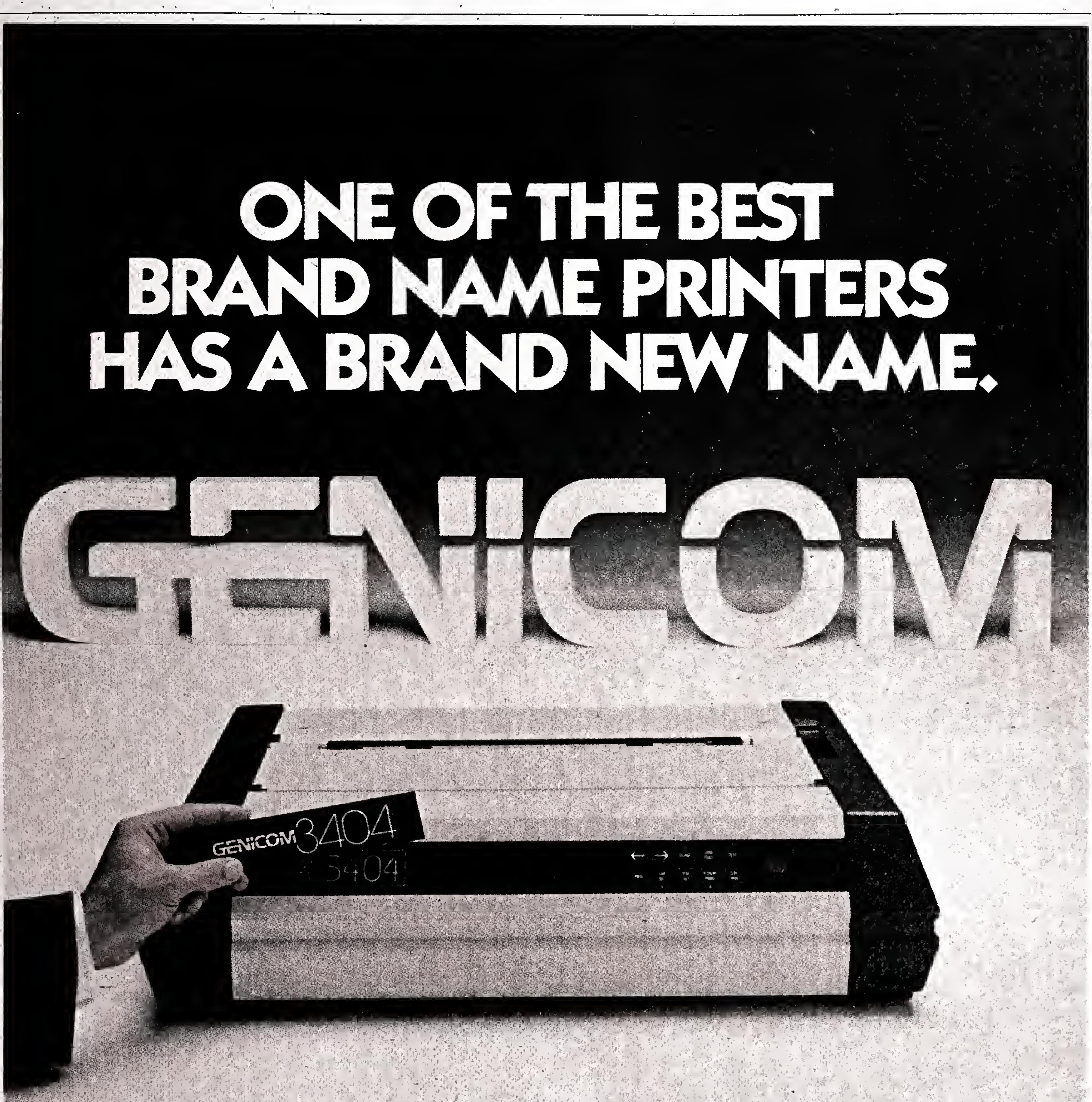
Texprint, Inc. has announced Print-It Model 2, a parallel printer interface for the Apple Computer, Inc. family of computers.

Featuring 64K bytes of internal read-only memory, 202 graphics modes, 25 text modes and seven format modes, the Model 2 is compatible with Apple II and IIe microcomputers and over 15 models of printers, the vendor said.

Print-It Model 2 is said to handle 40- or 80-col. text, a standard and alternate font, color or black and white, low- and high-resolution graphics, double high-resolution graphics and, on the Apple IIe, automatic selection of the proper print format to match the current display screen.

The Print-It Model 2 card, including handbook and printer cable, is available for an introductory price of $99, according to the vendor. Its retail selling price will be $174.

Texprint, 8 Blanchard Road, Burlington, Mass. 01803.



The General Electric 3000 family of printers has become an industry leading product. But now, this popular printer series has a new name, because the Data Communication Products Department of GE is now an independently owned company called Genicom.

At Genicom today, we offer the same complete line of printers we offered while a part of General Electric. We have the same facilities, the same nationwide service network, and the same corps of experienced employees...only the name has changed.

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MICROCOMPUTERS

ADVANCED LOGIC SYSTEMS

The Business Card

Advanced Logic Systems (ALS) has introduced an integrated package of hardware and software for the Apple Computer, Inc. Apple II family of microcomputers.

This package, called The Business Card, includes the vendor's T/Maker III software package and a circuit board offering Digital Research, Inc.'s CP/M Plus operating system.

T/Maker III is an integrated program that includes word processing, spreadsheet, list management and bar charting capabilities.

With this program, there is no need to transfer data between programs.

The Business Card is available for a price of $499.

The price of the standalone Apple CP/M version of T/Maker III is $275.

Current users of either the ALS CP/M Card or Z-Card can purchase T/Maker from ALS for $165.

ALS, 1195 E. Arques Ave., Sunnyvale, Calif. 94086.

INTELLIGENT TECHNOLOGIES INTERNATIONAL CORP.

Clusternet 3270

Intelligent Technologies International Corp. (ITIC) has introduced an enhancement to its PC Express communications package that it claimed will broaden the package's range of applications in IBM's Systems Network Architecture (SNA) environment.

Called Clusternet 3270, the new enhancement is said to be a printed-circuit board with SNA software that permits an IBM Personal Computer to serve as an IBM 3274 cluster controller linking as many as 12 Personal Computers with a mainframe.

The Clusternet 3270 board resides on a central Personal Computer, which is linked to the mainframe via a dial-up or leased telephone line and an external modem operating at 2,400, 4,800 or 9,600 bit/sec.

According to the vendor, the new package will be available for delivery in the first quarter of 1984 and is available as a standard feature of the PC Express with the SNA package, which is priced at $1,295.

ITIC, 151 University Ave., Palo Alto, Calif. 94301.

AUXILIARY EQUIPMENT

DUNCAN-ATWELL COMPUTERIZED TECHNOLOGIES, INC.

Lenipen/XT; Lenipen/Jr.

Duncan-Atwell Computerized Technologies, Inc. has announced color graphics systems for IBM microcomputer users, including artists, architects, computer-aided design and manufacturing engineers, doctors and graphics programmers.

The Lenipen/XT was designed for use with the IBM Personal Computer XT and XT/370 and compatibles.

A scaled-down version of the Lenipen/XT, the Lenipen/Jr., was designed for the IBM PCjr.

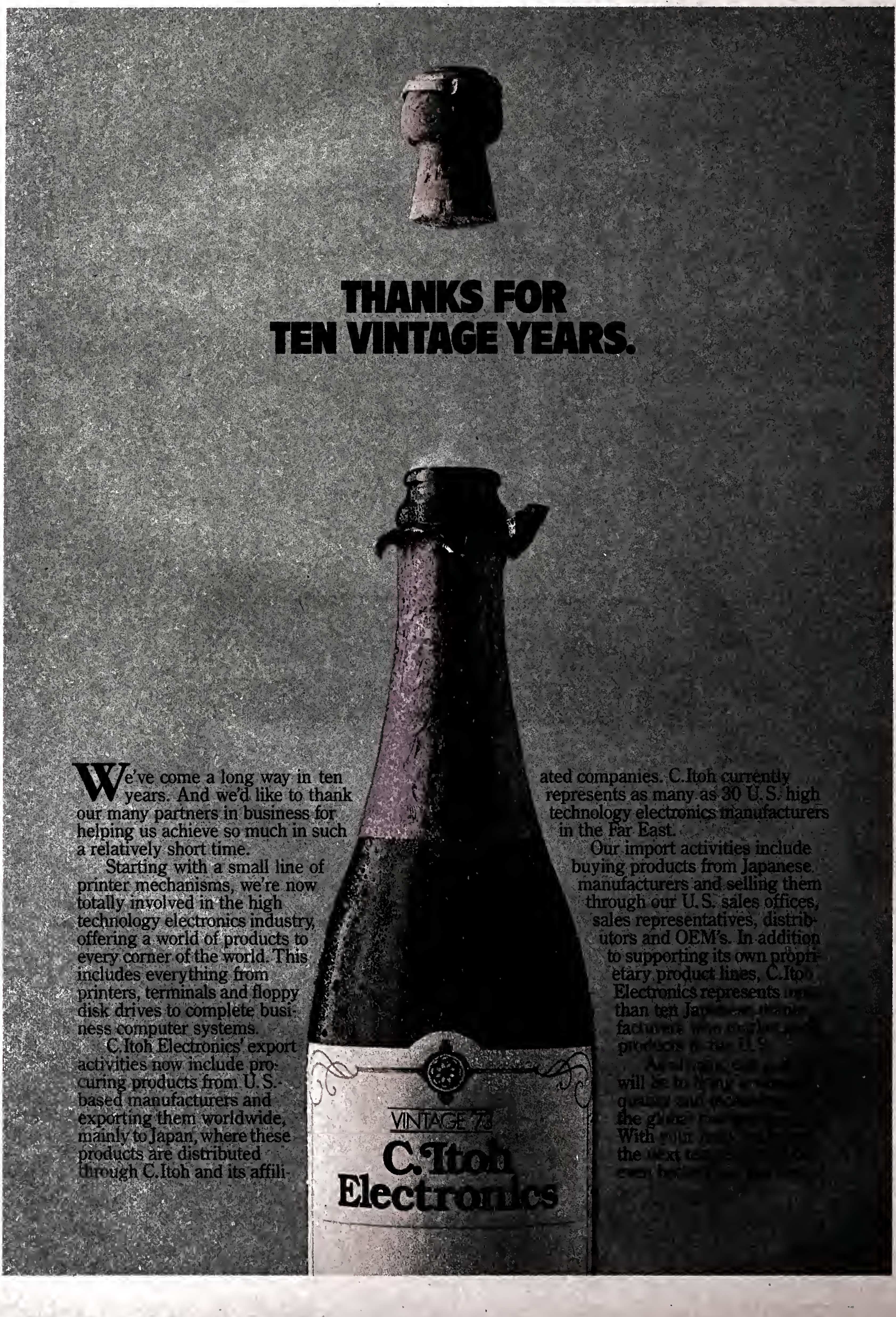
Both products are said to be direct derivatives of the vendor's Lenipen 1.0.

The products reportedly support various I/O devices, with light pens as the primary source of graphics input.

The vendor said the products provide for user logic programming, which allows the user to create a graphics image with a light pen, mouse or keyboard, while the system creates a Lenigram program of the image that can be saved and recalled.

The Lenipen/XT is priced at $695, and the Lenipen/Jr. is $345.

Duncan-Atwell Computerized Technologies, 1200 Salem Ave., Hillside, N.J. 07205.



We've come a long way in ten years. And we'd like to thank our many partners in business for helping us achieve so much in such a relatively short time.

Starting with a small line of printer mechanisms, we're now totally involved in the high technology electronics industry, offering a world of products to every corner of the world. This includes everything from printers, terminals and floppy disk drives to complete business computer systems.

C.Itoh Electronics' export activities now include procuring products from U.S.-based manufacturers and exporting them worldwide, mainly to Japan, where these products are distributed through C.Itoh and its affiliated companies. C.Itoh currently represents as many as 30 U.S. high technology electronics manufacturers in the Far East.

Our import activities include buying products from Japanese manufacturers and selling them through our U.S. sales offices, sales representatives, distributors and OEM's. In addition to supporting its own proprietary product lines, C.Itoh Electronics represents [illegible] than ten Ja[illegible] fa[illegible] p[illegible]

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COMPUTER INDUSTRY

Semi demand sign of times

INDUSTRY INSIGHT

BILL LABERIS

If you are interested in knowing just how vibrantly the computer industry will perform overall in the new year, look no further than the semiconductor sector.

Simply put, the companies that make the elemental pieces of computer systems massive and small generally cannot meet demand for their products now. The worst case (or best, depending on how you look at it) is given by the microprocessor makers, which in some cases will meet no more than 25% of the demand for their processing chips.

The pace of recovery in 1983 clearly caught the chip makers off guard, and thus they were slow in ramping up production, especially since most of them had reacted to the 1982 recession with layoffs. This, compounded by the fact that it takes about four months to produce a typical memory or processor chip, has sent many computer makers scrambling to find reliable second and third sources for key components.

But all too often in recent months computer makers have had to deal with the harsh reality that their components suppliers are just sold out, making promises of no better than six-month-plus lead times in many cases.

However, 1984 will likely witness a scenario wherein semiconductor supply finally catches demand, as production shortages abate and the industry settles into shipping about 3.5 billion chips per month — a full 60% above 1983 levels and nearly 200% above 1982 levels.

For system makers and end users alike, one result of this boom

See **SEMI** page 80

Retail chains vary strategies

Few employ marketing plan aimed at big business

By Peter Bartolik
CW Staff

Computer store chains are uniformly involved in a rapidly growing business, but the strategies employed by such chains to target their services to particular business markets are apparently quite varied.

Three nationally recognized chains of varying size were recently queried by *Computerworld* about strategies developed to target that segment of business represented by the Fortune 1,000 list. Only one company said it employs a specific strategy for targeting big business.

ENTRÉ COMPUTER CENTERS

Contacted were officers of Computerland Corp., the largest computer store chain with more than 550 franchised stores open nationally; Entre Computer Centers, Inc., which has identified itself as the second largest chain with 100 stores already open and franchises granted for an additional 100 stores that are opening at the rate of 15 to 25 a month; and Byte Industries, Inc., an up-and-coming organization with 19 Byte Shop stores already opened and plans to expand its market with revenues from an anticipated public offering slated for this month.

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Both Byte Shops and Entre first began franchise operations in 1982, although the original Byte Shop was opened in 1975. Computerland, which more than doubled sales volume to about $1 billion in 1983, was founded in 1976 and opened the first store in 1977. Entre posted $28 million in sales to franchises in 1983, up from $687,444 during its first year of operations; Byte Industries would not comment on sales volume because of the pending offering.

"We are not a home computer retailer," declared Entre's advertising director Michael H. Savage during a recent interview. "We are concentrating almost entirely on business, including small business, professionals and corporations."

Entre, with an estimated 50% to 60% of its sales going to big business, was the only chain with a specific strategy for gaining a foothold in the corporate marketplace. Entre also recently announced a public offering, with revenues to be used for "general corporate purposes."

Byte Shops, according to President David Pava, have a three-pronged marketing approach aimed at the "high-end home use," personal productivity applications in all types of businesses and specific vertical market applications in which it intends to be-

See **RETAIL** page 80

National Semi reports strong gains

SANTA CLARA, Calif. — Reflecting the continued boom in demand for micro circuits of all types, National Semiconductor Corp. reported strong quarterly gains in sales and profit as well as record-setting order rates.

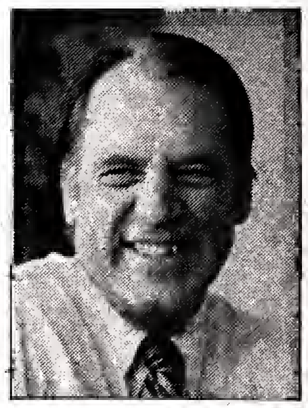
For its second quarter, the company posted sales of $369 million, a 33% increase compared with the same period a year earlier. Profit in the quarter totaled $13 million, or 15 cents per share, compared with a loss of $3.5 million in the second quarter a year ago.

Commenting on National Semi's performance, Charles E. Sporck, president and chief executive officer, said both the company's components and systems divisions showed continued bottom-line improvement.

In addition, Sporck reported that capital spending in the first six months of fiscal 1984 jumped 38% to $83 million, with total capital spending for the year expected in the $200 million range, compared with $131 million in fiscal 1983. A significant portion of the current capital outlays will be directed at increasing current wafer fabrication capacity, including the construction of a new plant in Arlington, Texas, and a new research and development center here.

"Our goal," Sporck said, "is to expand fabrication and assembly capacities to meet current and projected growth in demand."

Stanford welcomes $21 million research gift/72



Back to basics with HP's Young/73

INSIDE

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- $260 million buys AT&T a slice of Europe/**80**
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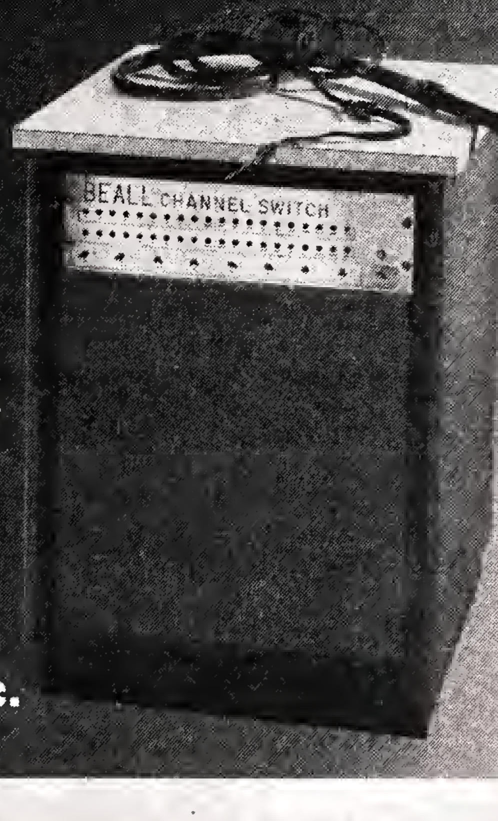
- In short, what's happening/**82**

A Simon Legree for Computers



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Stanford gets grants to study link between languages

By Robert Batt
CW West Coast Bureau

PALO ALTO, Calif. — Grants totaling $21 million have been awarded to a group of computer scientists, philosophers, logicians and linguists at Stanford University in an attempt to create a breakthrough in man's understanding of the link between natural and computer language.

The grants, made by the System Development Foundation of Palo Alto to the Center for the Study of Language and Information, will extend over four years and will eventually sponsor research by almost 100 professors, postdoctoral students and researchers from Stanford, SRI International, Inc. and Xerox Corp.'s Palo Alto Research Center (Parc).

"The purpose of the project is to take the body of insights into language from linguistics, logic, philosophy and the humanities together with the new challenges posed by computational languages and develop theories adequate to both," according to Jon Barwise, who is director of the Center for the Study of Language and Information.

Through their studies, the researchers have developed a new view of language, Barwise said. This view is that language and computation are two sides of the same coin. Central parts of the study of language and of computer science make up a single subject matter, which they have termed "situated language."

Terry Winograd, a professor of computer science at Stanford, said, "It is not our goal to create new applications, rather it is to establish theories essential to the design of computers and, by bringing people together from different disciplines, to create a body of knowledge that will allow us to lay the foundation for a whole new discipline."

According to the researchers, situated languages include natural languages like English and Chinese as well as computer languages such as Pascal and Lisp. This view of language centers on three complementary insights: that natural language use is fundamentally computational, that computational practice is fundamentally linguistic and that understanding linguistic activities in any real situation requires theories based on solid semantic foundations, theories that connect computation and language with information from the world.

"This theoretical framework will be the basis not only of a deeper understanding of natural language and computation, but the basis for practical developments involving the interaction of computers and humans," the researchers noted in a paper to the foundation.

Truth not absolute

These theories, Winograd claimed, challenge traditional logic by asserting that the truth of any statement is not absolute, but is related to the context, or situation, in which it is made.

Charles Smith, director of programs for the foundation, claimed, "This notion is central to making computers work intelligently."

The research at the Stanford campus has been going on informally for the past two years.

Brian Smith of Xerox's Parc has taken the group's ideas to develop the 2-Lisp and 3-Lisp computer languages, which reportedly enable computers to ask questions of themselves about their own state, a capability known as the power of reflection.

The Stanford research will be supported by more than 100 Xerox 1108 Dandelion workstations, three Digital Equipment Corp. VAX-11/750 superminis and a DEC 2060 mainframe. The systems will be tied together by Xerox's Ethernet local-area network.

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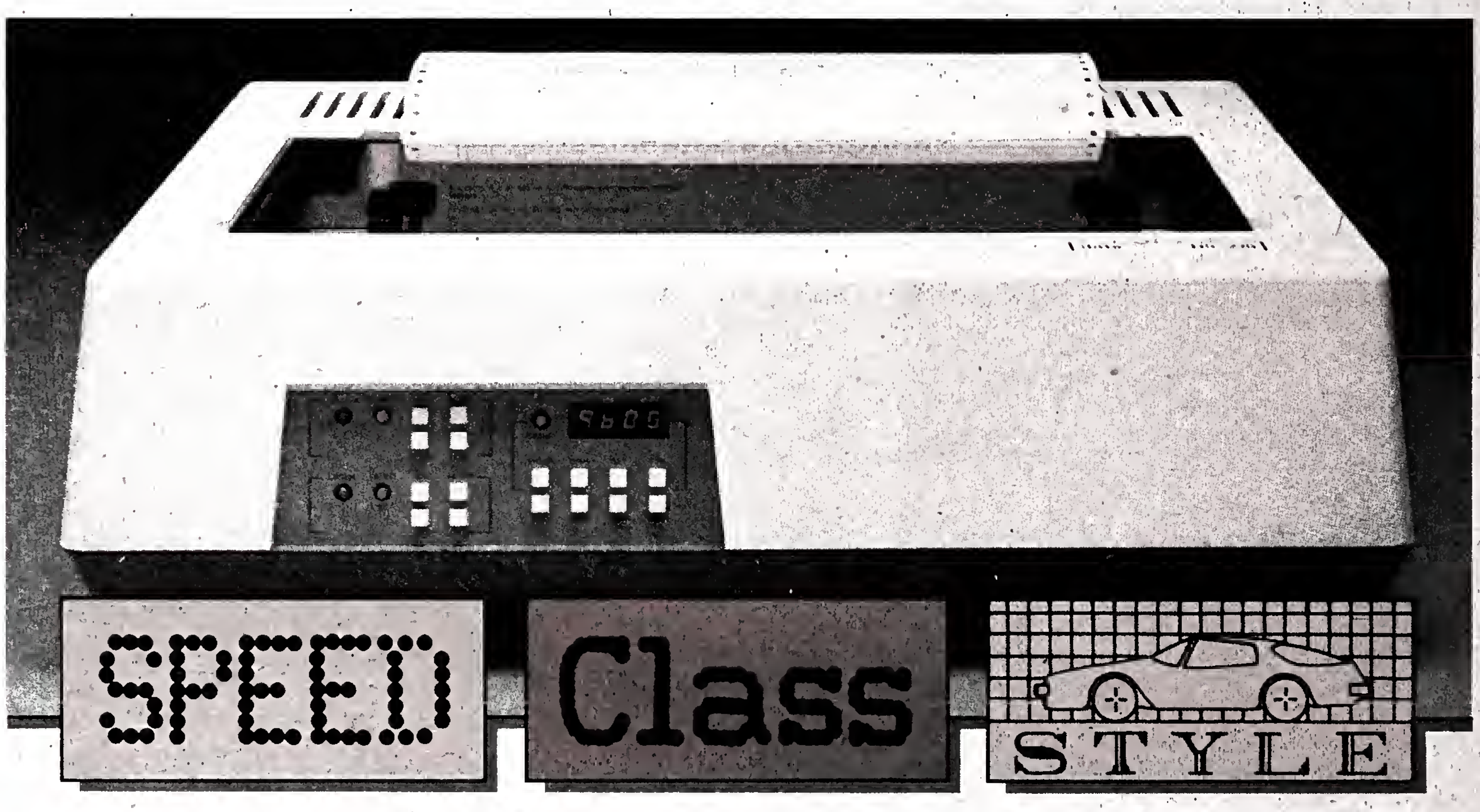

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U.S. high tech must return to basics: panel

To restore reputation as world leader

By Robert Batt
CW West Coast Bureau

PALO ALTO, Calif. — U.S. high-technology industries will have to get back to basics if they are to restore their reputation for world leadership, according to John Young, president and chief executive officer of Hewlett-Packard Co.

Speaking at the second meeting of the recently formed President's Commission on Industrial Competitiveness, Young, who was appointed by President Reagan to chair the commission, said there are no quick fixes to the malaise affecting many of the nation's economic sectors.

At the same time, Young said, the commission's view is that U.S. industry does not suffer from an incurable disease, but is rather in need of vigorous rejuvenation.

"In dealing with the questions of industrial competitiveness, I tend to concentrate on fundamentals such as capital resources and trained manpower," Young said.

"Without the fundamental ingredients, we cannot stay in the competitive race and, so, returning to the basics is the business now facing the nation," Young told a press conference following the commission hearing.

Young said the commission, charged by Reagan with reviewing ways to increase competitiveness, especially in high technology, will make specific proposals during the course of its deliberations before issuing a final report by December 1984.

"Our aim is to look for specific areas that can make a difference in some measure to creating a forward motion that over time can have a considerable impact," he said.

Budget deficit

Also at the commission hearing, John Ong, president of B.F. Goodrich Co. and co-chairman of the commission's subcommittee on international trade with Robert Noyce, vice-chairman of Intel Corp., admitted that the commissioners are unlikely to come up with proposals that sharply increase the administration's controversial budget deficit, currently approaching $200 billion.

"We are trying to avoid being just another advocacy group, with a list of proposals that do not take account of current realities," Young added.

Ong stressed the commission's goal was to identify public policy areas in which it can recommend government action, for example, tax credits or propose congressional legislation to deal with a specific problem.

"The more carefully thought out our proposals, the more effective we will be as a commission," according to Ong.

In his presentation to the commission, David Crockett, president of Dataquest, a Silicon Valley, Calif.-based market research firm, said Japan will continue its dominance in many areas of the semiconductor market.

In the area of 256K-byte dynamic random-access memory (RAM), he contended, the major Japanese manufacturers, such as Hitachi Ltd., Fujitsu Ltd., Nippon Electric Co. and Toshiba, will ship around 14 million units this year, compared with 800,000 in 1983.

Crockett estimated Japan's share of the immature dynamic RAM market at 76%. "In the 1980s, the technology thrust will shift from dimension reduction to applications," he told the commission.

Commission members include several high-level industry figures, such as Mark Shepherd, chairman of Texas Instruments, Inc., and Noyce; respected academics, such as Michael Porter, professor of business administration at Harvard University; and government officials, including George Keyworth, science adviser to the president.

Among the areas being investigated by the commission are capital resources, research and development, manufacturing, human resources, international trade and industrial strategy.

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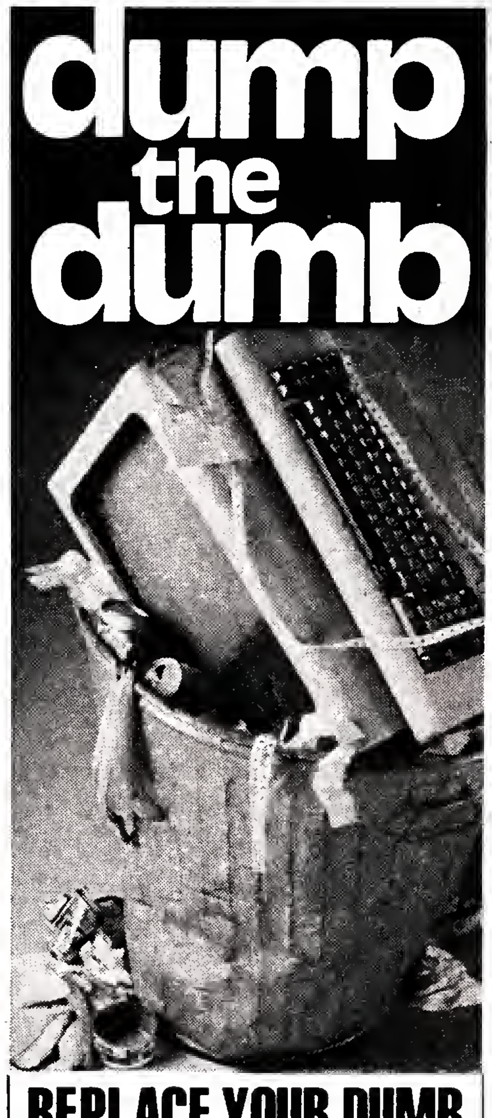

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IBM, Syracuse enter AI pact

SYRACUSE, N.Y. — Syracuse University and IBM have entered into a multiyear cooperative research program designed to broaden artificial intelligence (AI) development efforts, the university announced recently.

IBM will provide a 4341 mainframe, as well as an assortment of minis, personal computers and terminals, with Syracuse University providing the research staff to develop and implement AI capabilities for IBM's systems.

The research will be conducted in four areas. The first two research projects will concentrate on enhancing existing AI languages; the other two research projects will concentrate on developing an expert system to assist users in accessing a computer system.

Sperry comments

Clarification: In response to an industry analyst's claims about Tandy Corp.'s Model 2000 microcomputer [CW, Dec. 26/ Jan. 2], a Sperry Corp. spokesman acknowledged the Tandy machine's edge in processing speed, but credited his own firm's micro with providing superior IBM compatibility. The Sperry comments were received after press time.

Anacomp defaults on lending agreement

INDIANAPOLIS — Financially troubled Anacomp, Inc. has defaulted on portions of a $45 million lending agreement with several of its creditors as efforts to reach a refinancing agreement have failed.

According to company officials, Anacomp did not honor all conditions of loans made to it by Chase Manhattan Bank and Manufacturers Hanover Corp. in New York, Bank of America in San Francisco, Fletcher National Bank in Indianapolis and Lloyds Bank International Ltd. of London.

The systems integrator and software house has suffered losses in excess of $16 million in its last two reporting quarters, with substantial losses anticipated in the quarter ended Dec. 30. The company had been mentioned as a possible merger candidate [CW, Nov. 28].

To counter its losses, which were due in large part to delays Anacomp has experienced in marketing a banking software program, the company has reduced its work force by about 10%, or 220 workers, and cut salaries companywide.

The company has also reigned in capital spending and ceased dividend payments.

Meanwhile, Anacomp is seeking to spin off its data services business to raise capital.

Market research firm offers subscription plan

ROCKVILLE, Md. — A computer market research firm has announced the availability of a subscription program for clients wishing to sell information and telecommunications technology and services to the federal government.

Input claimed its Federal Information Systems and Services Program provides information on executive agencies' expenditures for automated data processing and telecommunications through 1990.

Input said that the program interprets the government's procurement plans for use by companies in their planning processes.

According to Input, the procurement plans of government executive agencies are public information, but often use reporting techniques that obscure the size of acquisition programs.

Thus, Input said, the list of major systems acquisitions published by the U.S. Office of Management and Budget, General Service Administration and National Bureau of Standards is incomplete.

More information on the program is available from Input, located at 11820 Parklawn Drive, Rockville, Md. 20852.

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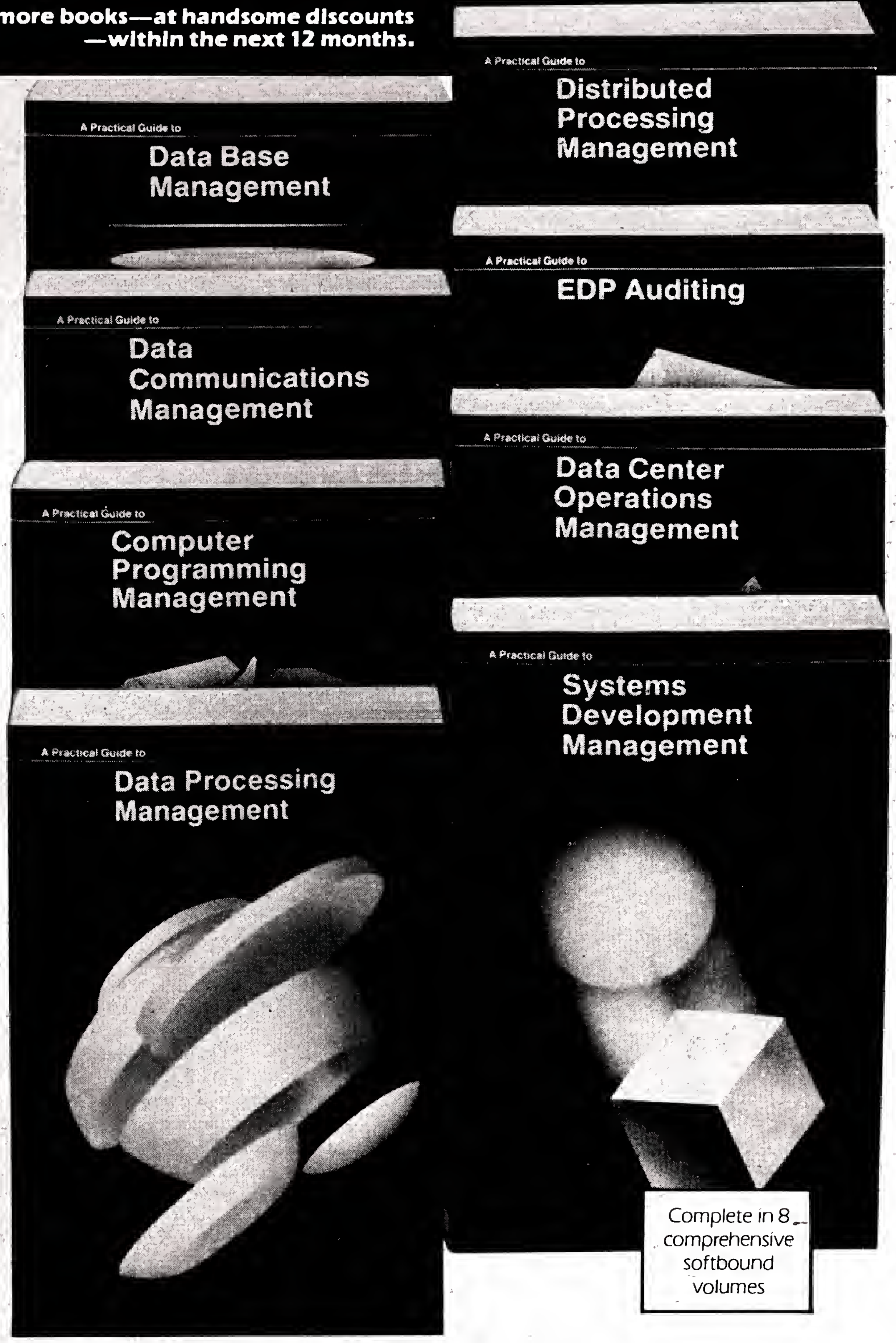

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Computerworld 1/9/84

Market for portables still strong but fragmenting

OUTSIDE LINES

BOHDAN SZUPROWICZ

By Bohdan O. Szuprowicz
Special to CW‡

The so-called portable computer is fast becoming the most talked-about variant of the personal computer revolution. But what is not entirely clear is that some of the portable computer promoters are also getting carried away with a lot of very heavy media hype not unlike that which preceded the home computer shakeout of recent months.

The portable computer market is also splintering rapidly into several segments, including desktop, suitcase (transportable or luggable), briefcase and notebook categories. Some analysts also throw hand-held computers into what is sometimes dubbed the "mobile" computer products group.

All this only further confuses the end users and investors alike who are still trying to recover from the shock of the rapid demise of Osborne Computer Corp. after its spectacular rise to portable computer pioneering preeminence in just two years.

Optimistic Forecasts

Despite that bankruptcy, market forecasts suggest that during 1982 nearly $300 million in portable computers were sold, primarily in the U.S., which so far accounts for 90% of the market. For 1983, this market will likely increase more than 200%.

In the longer run, a tenfold increase in the sales of portable computers is seen within the next few years, and between 20% to 25% of all microcomputers in use by 1987 are expected to be in that category.

Whether or not portables will remain similar to those now capturing the imagination of end users is another matter.

Chances are that technological developments are so rapid and competition so fierce that new, much more portable computer products will be thrown at users at an ever-increasing pace for the conceivable future, making existing models obsolete almost overnight.

Transportable Variety

So far the bulk of portable computers is of the transportable, suitcase-size variety, weighing from 18 to 40 lb and being no more portable than the average home TV set. Studies show that up to 80% of those machines are never moved and that they are used mostly in business applications, as they are cheaper than standard desktop units that would otherwise be used. Due to strong initial sales, Osborne dominates market share, followed by IBM-compatible maker Compaq Computer Corp.

The next supplier with a reasonable market share thus far is Isbytec Corp. of Canada, whose Hyperion has about 5% of the total. The remaining 25% of the market is being split by at least two dozen firms that have since entered the business.

What few outsiders realize, however, is the fact that the market for these relatively heavy portables has already peaked and is being overtaken by lighter, cheaper and almost equally powerful briefcase portable computers.

Some of these are sufficiently compact that you may be tempted to take one with you even when you are almost sure that you will not need to use it. That is the true test of portability in computers.

Notebook Portables

Even more convenient are the notebook portable computers, which are under 6 lb in weight, although their capabilities today are still somewhat limited.

But rapid developments in custom very large-scale integration microchips and solid-state memories as well as low-power, flat panel displays guarantee a veritable flood of new portable designs, and current product life cycle is seldom more than two to three years at best.

Perhaps the best indication of future trends is the fact that current portable computer market leaders Kaypro, Inc. and Compaq are already rumored to be working on briefcase, lightweight portables presumably of the 16-bit IBM Personal Computer-compatible variety. This is significant in that both companies increased their sales dramatically during 1983. Kaypro posted a 1,400% revenues increase to more than $75 million and promptly went public at $10 per share as soon as it became profitable.

Rising Revenues

Compaq's revenues rose spectacularly from $4.8 million the first quarter of 1983 to $18.1 million in the second and $36 million in the third, when the company became profitable.

Compaq has been very well financed with almost $30 million in venture capital and is already rushing to go public, registering six million shares for sale last October.

But at the time Compaq also stated that its backlog for deliveries through the fourth quarter of 1983 was only $40 million. This suggests that while the company may indeed do $100 million of business in 1983, the explosive revenue growth period may be over.

Rapidly growing competition is not the least factor affecting such growth. Anderson-Jacobson, Inc.; Columbia Data Products, Inc.; Computer Devices Corp.; Corona Data Systems, Inc.; Dynalogic Information Technology Corp.; Eagle Computer, Inc.; and Seequa Computer Corp. are all now in the market with 16-bit IBM Personal Computer-compatible transportable computers of the same category.

Szuprowicz is president of 21st Century Research of North Bergen, N.J.

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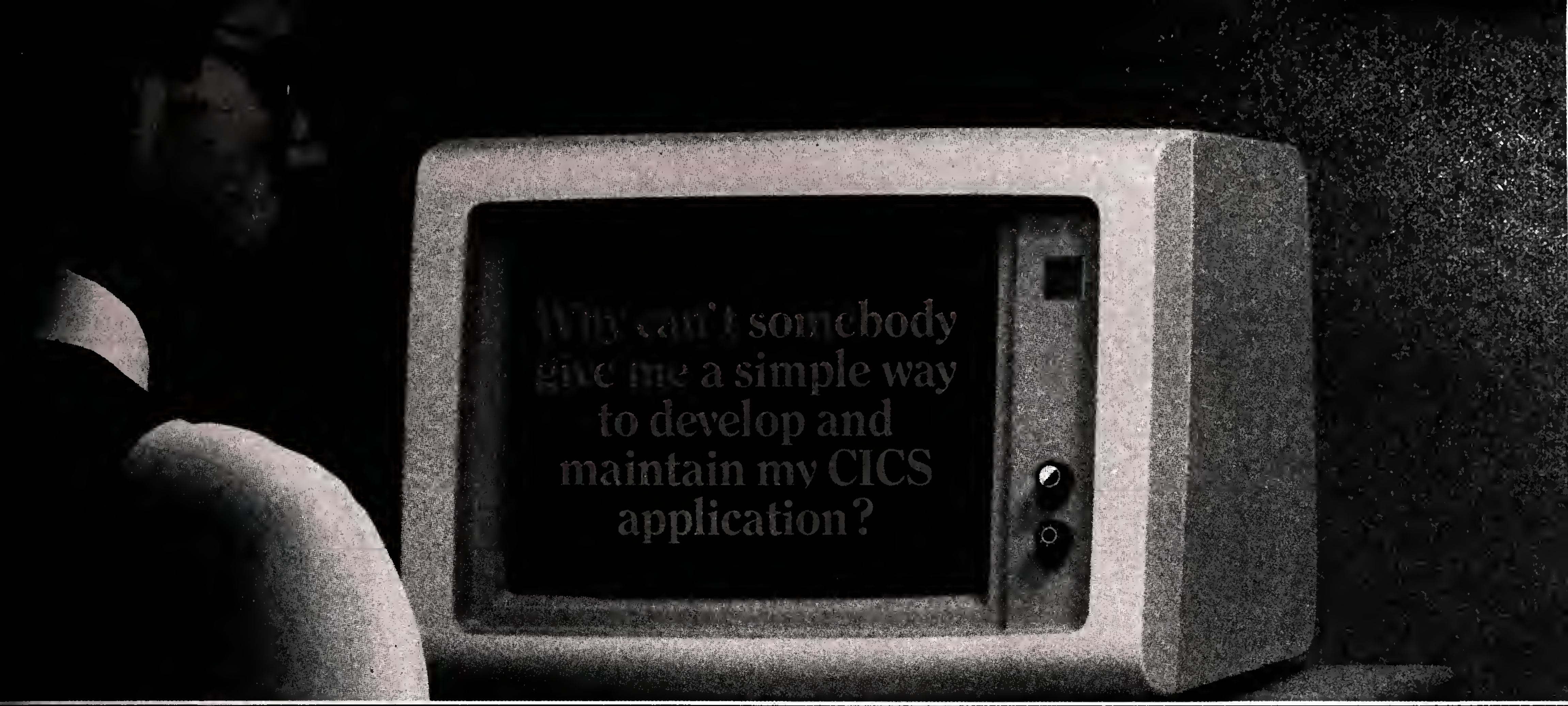

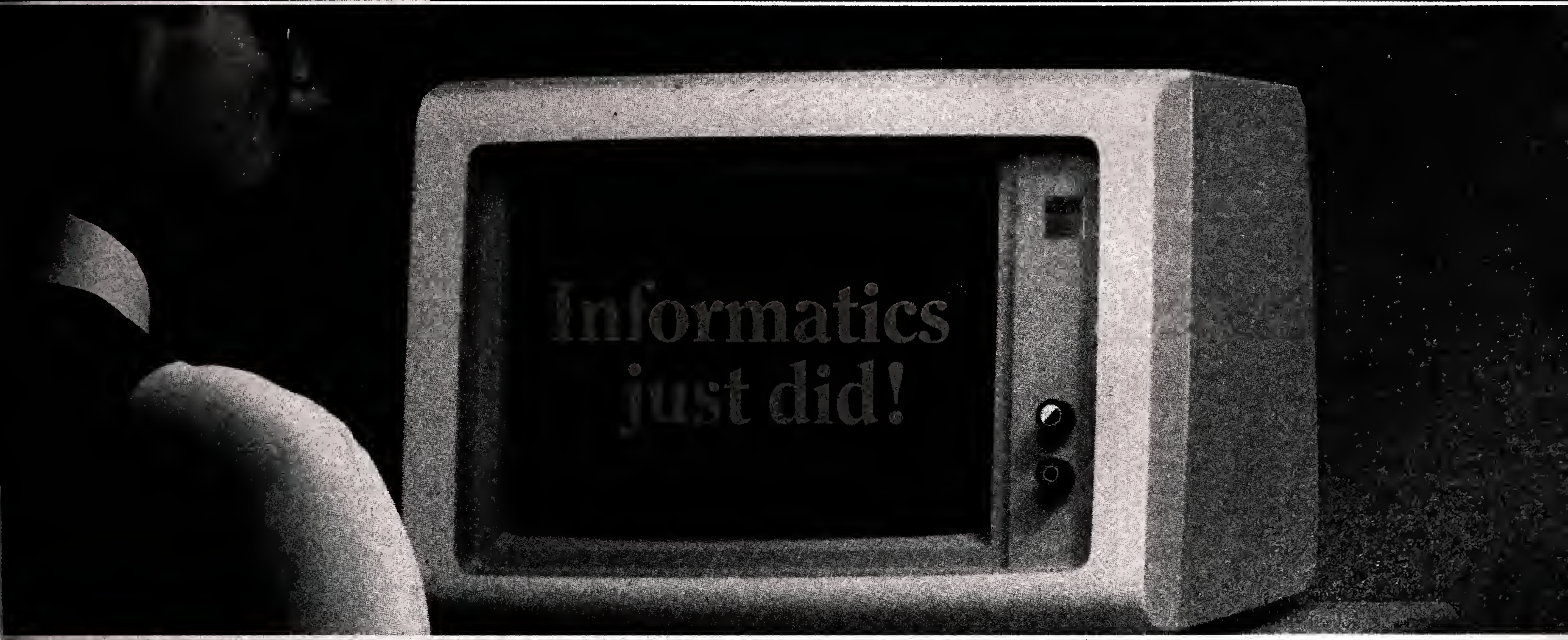

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DEMAND

from page 71

should be the ability to manufacture and market the next generation of memory chip — the 256K-byte random-access memory — a little more quickly than had been predicted. Right now, Texas Instruments, Inc. is passing out samples of its 256K-byte version; Intel Corp. and National Semiconductor Corp. will do the same in the first or second quarter of this year; Motorola, Inc. will be sampling in the second half of the year; and Advanced Micro Devices, Inc. should join the pack in early 1985.

In addition, greater sales and profits will yield greater research and development and capital investment dollars, making possible the first shipments of a 1M-bit chip by as early as 1986.

These and other key bits of semiconductor data have been made available by semiconductor management, which heretofore had been somewhat closemouthed.

■ Depending on whom you believe, it was either an administrative foul-up, a misunderstanding of commonly accepted protocol or a miserly act of Scroogian proportions.

But whatever the case, a lot of trade press and business press people were a bit upset with AT&T when the communications behemoth declined to pick up the luncheon tab for the press when company chairman Charles Brown spoke to the New York Security Analysts Society just before the holidays.

How upset? Given the then-announced demise of Western Electric Corp. and the impending Jan. 1 divestiture, Brown's appearance would ordinarily have drawn legions of media types. Perhaps a half-dozen actually showed up.

It wasn't the $20 luncheon fee that scared them off. The press simply does not pay to cover a news event. This long-standing practice made particular sense in this case, a luncheon for a $100 billion company featuring its chairman, whose intent was to take the podium and hit home-run balls. And the press wasn't allowed in without paying for lunch.

As a rule, according to the Analysts Society, the guest company picks up the press tab, no questions asked. Prior to its luncheon, AT&T reacted to the press protestations by saying it would have been silly for the company first to be invited to lunch, then to have to pay for a portion of it, albeit a very small portion.

Eventually AT&T saw the error of its ways and held a hastily called press conference the morning of the luncheon. The press conference was free of charge.

However, one attendee mentioned something about a collection plate next to the press table.

RETAIL

from page 71

come the "total solution" stores for specific markets. Big business, per se, has "not been identified as a specific group that we are going after.

At Computerland, according to Vice-President Don McConnell, the specific marketing strategy is to "support the franchisees' marketing efforts for whatever segment they are targeting. To the extent that they seek the Fortune 1,000 companies, we support them with products, training and customer support."

To that end, McConnell added, Computerland offers franchisees its Class program — Computerland Large Account Support Service — to assist in negotiating large account customers and providing ordering and invoicing services.

The benefit of dealing with computer stores for big business rather than a vendor's direct sales force, according to Entree's Savage, is that "a prospect is not locked into a single brand." Entree offers a mix of several popular micro brands and "has a very strong value-added concept." By offering servicing, training, education and support, he added, "we just don't sell them a piece of hardware and kick them out the door."

AT&T to aquire 25% of Olivetti

NEW YORK — In a move designed to power a major thrust into the European computer market, AT&T agreed just before the year-end holidays to pay $260 million to acquire 25% of Italy's Ing. C. Olivetti & Co. AT&T maintained an option to increase that stake to 40% after four years.

The deal involves the purchase for cash by AT&T of 100 million newly issued Olivetti shares sometime during the first quarter of this year.

Under the terms of the agreement, Olivetti will begin distributing AT&T's products, including switching equipment, private branch exchanges, software and microprocessors. AT&T, however, has made no agreement as of yet to distribute Olivetti's office automation products in the U.S., a market in which Olivetti is not a major player. Such an agreement is being negotiated, AT&T said.

In general, analysts felt that Olivetti's European market presence would be a major boon to AT&T in that sphere, while AT&T's financial backing and tech support would yield the greatest benefits to Olivetti. AT&T has a limited communications presence in Europe, due largely to the state-controlled communications systems in many European countries.

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EXECUTIVE CORNER

■ **Herbert M. Shanzer** has been named vice-president and general manager of the new Desktop Division of Data General Corp.

■ **Michael Barker** has been named vice-president, manufacturing operations, at Micom Systems, Inc.

■ **David J. Stewart** has been promoted to vice-president, development programs, for the System Sciences Division of Computer Sciences Corp.

■ **James F. Ferenz** has been named vice-president of manufacturing at Fortune Systems Corp.

■ **Jerald B. Higgins** has been promoted to vice-president, worldwide systems sales for Zilog Systems, a division of Zilog, Inc.

■ **Arthur D. Lambert** has been named vice-president, North American sales for Zenith Data Systems Corp.

■ **Dr. John Francis Lubin**, professor of management at The Wharton School, University of Pennsylvania, has been elected to the board of directors of Data General Corp.

■ **D. T. Wiles**, chairman of the investment banking firm of Hambrecht & Quist, has been elected chairman of Magnuson Computer Systems, Inc. Magnuson Computer Systems has been operating under the protection of Chapter 11 of the Federal Bankruptcy Code since March.

■ Martin Marietta Data Systems, Inc.'s Vice-President **Shirley F. Prutch** has been named chairwoman of the National Bureau of Standards' Panel for the Institute for Computer Sciences and Technology for a three-year term. She will also serve as an ex officio member of the Board on Assessment of the National Bureau of Standards Programs.

■ **Dean O. Morton**, executive vice-president of Hewlett-Packard Co., was elected chairman of the board of directors of the American Electronics Association for 1984 at its recent board meeting.

■ **Donald L. Steele** has been appointed vice-president of University Computing Co. and general manager of its applications software division.

■ Computer Consoles, Inc. has announced the appointment of four vice-presidents. They are **David N. Danchak**, central engineering; **Robert J. LoFaso**, corporate marketing services and support services; **John M. Morphy**, controller; and **Jeffrey H. Waxman**, office systems sales.

■ **Kevin Ellington** has been appointed vice-president of business development, and **James D'Arezzo** has been named vice-president of corporate communications at Compaq Computer Corp.

■ **Peter A. Chiasson** has been named vice-president and general manager of the Marketing Division of Computervision Corp.

■ **Dennis D. Elkins** has been promoted to vice-president, sales, and **Ray A. Wilson** has been promoted to vice-president of the Computer Services Group at NCA Corp.

■ **James S. Campbell**, former president of Shugart Corp., a Xerox Corp. subsidiary, has been appointed president, chief executive officer and chairman of Fortune Systems Corp.

■ **Larry D. Wickwar** has been promoted to vice-president, product development, and **Roger M. Lane** has been named vice-president, customer service logistics, at Datapoint Corp.

NICKELS & DIMES

Systematics, Inc. has announced second-quarter revenues of $18.6 million and net income of $1.4 million, up 18% and 15%, respectively, over second-quarter last year.

■

Moody's Investors Service has raised the rating on the senior debt of **NCR Corp.** from A2 to A1. The change affects approximately $248 million of debt. Moody's has also assigned a Prime-1 rating to the commercial paper of **NCR Credit Corp.**, a wholly owned NCR Corp. subsidiary.

■

Software AG Systems, Inc. has reported revenues of $9.9 million and net income of $1.3 million, or 21 cents per share, for second fiscal quarter ended Nov. 30, compared with revenues of $7.2 million and net income of $370,000, or six cents per share, for the same period last year.

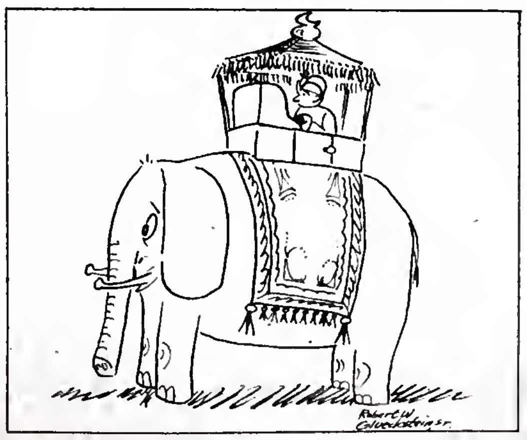
■

Management Assistance, Inc. has announced revenues of $376 million for fiscal year 1983 compared with $358 million for the previous year. Net income was down for the year at $1 million, or 14 cents per share, compared with $7.5 million, or 92 cents per share, for 1982.

■

Moody's Investor Service has lowered its rating on **Digital Equip-**

Continued on page 82



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Continued from page 81

ment Corp.'s $75 million sinking fund debentures from Aa1 to Aa2. The company's commercial paper rating remains unchanged at Prime-1. The action reflects DEC's lower operating profit margins and Moody's belief that those margins and profitability will remain under pressure over the intermediate term.

■

Electronic Data Systems Corp. has reported revenues of $176.4 million and profits of $16.8 million for the first quarter of fiscal 1984, up 23% and 24%, respectively, over the same period last year.

■

IBM has declared a regular quarterly cash dividend of 95 cents per share on common stock payable Dec. 10 to holders of record Nov. 9.

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Wang Laboratories, Inc. has licensed text-to-speech technology from **Speech-Plus, Inc.** of Mountainview, Calif. The software technology uses 400 letter-to-sound rules and an exceptions dictionary with 3,000 entries to convert serial Ascii English text to immediately intelligible spoken English.

■

Shand, Morahan & Co. has formed an EDP Risks Department as the result of increasing awareness of loss potential in the computer field. The underwriters in the new department will concentrate solely on data processing risks, including unauthorized computer access coverage, electronic data processing professionals' errors and omissions coverage and the development of other computer-related policies.

■

Burroughs Corp. and **Telex Computer Products, Inc.** have announced their intention to form Plasma Graphics Corp., a jointly owned company that will manufacture and market a line of advanced flat panel information displays for use with computers and electronic instruments. Upon completion of definitive agreements, Plasma Graphics will begin operations in the first quarter of this year at a Plainfield, N.J., facility.

■

E. F. Hutton, which recently announced the Huttonline financial information service, will offer **Quazon Corp.'s** Quik-Link 300 terminal to Hutton subscribers on a value-added basis with the Huttonline service. Quazon President Jim Lokey said the terminal offered through Hutton's network of 5,000 brokers will be programmed to permit easy access via automatic logon to the Huttonline service. Hutton clients will be able to order a Quazon terminal directly through their account executives and to charge their purchase directly to their E. F. Hutton accounts.

■

Sony Corp. of America has formed the **Sony Component Products Division** "to serve the expanded . . . [OEM] market in the United States," according to Kenji Tamiya, president and chief operating officer.

■

Dartmouth College has signed a contract with **Apple Computer, Inc.** as part of an overall plan to enable all incoming freshmen to acquire a personal computer at reduced cost by the fall of 1984. According to the agreement, Dartmouth will purchase at least $2 million in Apple equipment over the next three years, including products not yet on the market.

■

Wang Laboratories, Inc. has announced that **Cobe Corp.** of Madison, Wis., has been selected as an independent sales organization, bringing together Wang's computer technology and Cobe's experience in financial institution informational management. Cobe will market its Cobe-One financial programs on Wang's 2200 series of computers.

POSITION ANNOUNCEMENTS

Applications are invited from qualified applicants for the position of **Executive Director of the Washington Library Network (WLN).** WLN is an automated bibliographic service to libraries in eight western states and provinces, providing a wide range of library processing and information functions. A study by Peat, Marwick, Mitchell & Company to be completed in early 1984, will help determine future marketing and governance directions.

Opportunity for well-qualified manager to direct a high-technology agency toward continuing success.

The Director should:

- –be responsive to the WLN membership in developing an innovative program of automated bibliographic services for libraries.
- –provide effective day-to-day leadership to WLN operations, working with a diverse team of highly motivated data processing and library professionals.
- –exhibit managerial skills with substantial data processing administrative experience. Experience in a library setting is desirable but not required.
- –work with diverse groups in coordinating a productive pursuit of WLN goals and objectives.

The Director currently reports to the WLN Executive Officer, who is the Washington State Librarian.

This position is exempt from the Washington State Civil Service System, contingent upon Washington State Personnel Board approval.

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★ ATE DESIGN ENGINEERS
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Requires a BS and 4 years experience in Assembly language. Prefer applicants with Rolm 1666/Data General NOVA computers and military systems.

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★ RF/MICROWAVE ENGINEERS
Background in R.F. antennas, microwave power supply design, and computer-aided design and analysis will assume responsibility for UHF/VHF data transmission systems on a major program. Automated bus driven R.F. test equipment experience also desirable. Requires BS and 4 years experience in R.F. system design, analysis and testing.

★ EMC/EMI ENGINEERS
Background in R.F./microwave systems and digital electronics systems design and analysis. Will assume responsibility for EMC/EMI and TEMPEST activity on major program. Requires BS and 9 years experience in electronic system/circuit design, analysis and EMC/EMI testing. Experience in TEMPEST requirement satisfaction desirable.

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Dundalk Community College, a public comprehensive college serving Southeastern Baltimore County Maryland, has an opening for a Director of Management Information Services to assume overall responsibility for managing computer resources in a distributive environment.

The college is currently functioning within a shared computer environment and utilizes a host mainframe (IBM 4341). The college is committed to a path of development which will provide for enhanced and expanded local capabilities while at the same time maximizing potential interface with the host mainframe. Accordingly, the candidates selected will, in addition to normal administrative functions, coordinate and design the development of new systems to meet both administrative and academic computing needs.

Successful candidates will have five or more years of relevant technical experience in computer operations, programming and systems design, preferably in an educational environment including at least two years of experience in a project management capacity. They will possess demonstrated knowledge of a variety of hardware and software, database management systems and information systems designs and will also demonstrate the proper sense of urgency, commitment and interpersonal skills.

For application and a copy of the job description call (301) 522-5650 or write Personnel Office, Dundalk Community College, 7200 Sollers Point Road, Baltimore, MD 21222.

Applications must be postmarked no later than February 10, 1984. EOE/AA.

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VMS—requires at least 2 or more years of application and/or system software experience. Experience with VAX/VMS software a plus.

DECnet—requires at least 1-2 years' experience working with DECnet applications of VAX, RSX, and RSTS systems and a solid knowledge of communication protocols.

RSX—requires at least 2 years' applications or 1 year's systems experience with RSX-11M or RSX-11M-PLUS.

CTS-300/RT-11—requires at least 1 year's experience with applications and/or system experience.

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These positions (determined by applicant's level of experience) require a minimum of two years experience with business applications. COBOL and/or insurance applications experience required. Experience with structured analysis, structured programming, 8100-DPPX and IBM P/C desirable.

SYSTEMS ANALYSTS
PROGRAMMER ANALYSTS

These positions (determined by applicant's level of experience) require a minimum of two years experience with business applications. COBOL and/or insurance applications experience required. Experience with structured programming, structured analysis, OS/JCL, MVS, TSO/SPF, CICS, PANVALET desirable. Knowledge in the following areas is useful: property and casualty insurance processing, insurance accounting, systems development in an IMS environment. We also have an opening in Information Center for individual with experience in FOCUS and classroom training.

SENIOR DATA ADMINISTRATION ANALYST

Responsible for strategic data planning and for development and implementation of individual data bases. Strong experience in data administration necessary. Experience in one or more DBMS's, data dictionary, and/or insurance helpful.

SENIOR SYSTEMS ANALYST

This position requires technical competence in operations research, particularly as applied to usage analysis and resource costing. Requires solid background in large IBM MVS/SP environment supporting complex ACF/SNA network. Prefer experience with SMF, TSO, TCAM, CICS, and IMS statistical analysis.

IF YOU . . . . meet the requirements for any of these positions and would like to make a positive career move, indicate position of interest, send resume and salary history to:

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DP PROFESSIONALS

MEDICAL ENGINEERING, INC., a dynamic medical software firm, seeks qualified professionals for their Corporate Data Center. Hardware environment includes IBM Systems 34, 36, 38, 4341 using RPG II, RPG III, DOS/ VSE/VM, COBOL under CICS in a national communications network. Minimum 1-2 years experience in programming/design, BA or BS preferred. Send resume and salary requirements to: MEDICAL ENGINEERING, INC., 2675 Winkler Ave., Suite 108, Fort Myers, FL 33901 or call (813) 939-5211.

Data Processing

PYA/Monarch

PYA/Monarch, a division of Fortune 100 Consolidated Foods Corporation, is the third largest food service distributor in the U.S. We supply food and non-food products and services to restaurants, cafeterias, caterers, hospitals, schools and colleges, hotels and motels, etc., from coast to coast. Our corporation has grown from sales of $470 million to sales that now exceed $1 billion since 1978.

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Greenville, S.C. rests peacefully at the foothills of the Blue Ridge Mountains. Snow skiing, beautiful Carolina beaches and abundant lakes offer vibrant recreational opportunities. Combine the natural beauty with our low cost of living and Greenville, S.C. is a most inviting locale.

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Because of PYA/Monarch's commitment to maintain our dominant position in the food service industry, our present MIS plan will put in place an information processing environment unequaled in the food service industry. We afford capable professionals the opportunity to fulfill their professional, personal goals within a dynamic, innovative, ever-changing IBM 3083, MVS, on-line environment.

Project Manager - Distribution Systems

Strong systems analysis and design skills required to direct systems development projects in purchasing, inventory management and sales analysis. Applicant should be familiar with Data Base Management concepts and have experience managing major development projects.

Programmer/Analyst - Distribution Systems

Applicant should have experience in the development of large mainframe based distribution systems. Specific areas of planned development are order processing, purchasing and inventory management.

Programmer/Analyst - Sales Analysis

Applicant should have experience with Data Base Management systems and the development of sales reporting systems. Position requires good written and oral communication skills.

Quality Assurance Analyst

Monitor applications systems development process to ensure compliance with departmental standards, develop and implement sytems test plans and assist in the development of user documentation and training material. Knowledge of systems development process is required.

Installation Representative

Installation of application software and training of user personnel. Degree or course work in Computer Science is preferred. Travel required.

Please send resume and an outline of salary history to:

Department BK
PYA/Monarch Inc.
P.O Box 1328, Greenville, S.C 29602

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DIRECTOR OF INFORMATION SYSTEMS STRATEGY

A highly recognizable organization operating in 50 states is seeking a Director of Information Systems Strategy for its national Chicago-based location. This is a newly created, highly visible position responsible for establishing strategic and tactical consulting to affiliate companies. This position will lead a staff of systems consultants in providing state-of-the-art applications planning and technology assessment, comparative and competitive analyses, needs/problem identification, solution plan development and, implementation assistance.

EXPERIENCE REQUIREMENTS:

Candidate must be knowledgeable in the latest advances in information processing technology with a minimum of 6 to 8 years of experience in the following areas:

- Applications development for higher business systems using large scale IBM computers
- Equipment evaluation (CPU's Input/Output, COM, WP)
- Communications hardware and protocols, front ends
- Software evaluation (system control, language processors, applications systems, data base management)
- Capacity planning configuration management
- Installation and disaster planning
- Distributed processing

Excellent verbal and written skills are required. Travel up to 20-30%. BSEE, BS Computer Science, MBA or equivalent undergraduate degree required. We offer a highly competitive salary and an excellent fringe benefit package. Interested candidates send resume with salary requirements in confidence to:

Dept. J8
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Chicago, IL 60611

Equal Opportunity Employer M F

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SEI's role and reputation continue to grow as one of the nation's leading project-oriented, high technology consulting organizations. SEI consultant teams' skills are in demand to specify and construct sophisticated systems and applications across the country.

SEI looks to the future with a variety of new, challenging, large-scale system development efforts. New SEI projects include industrial automation, advanced microprocessor systems, and support for the emerging cellular telephone industry. These projects, now getting under way, offer you an unparalleled opportunity to be involved in major applications and internals efforts from the ground up.

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Direct the planning, staffing, construction of major mainframe and microprocessor-based development efforts. We're looking for hands-on, technically-oriented managers, who lead from personal, practical experience in the construction of sophisticated systems.

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- **Outstanding writing and editing credentials**
- **Minimum 4 years experience in programming, system analysis, and design**
- **Exceptional good sense and broad perspective on EDP**
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Your job? Determine what systems are actually supposed to DO! Perform requirements analyses, cost-benefit studies, preliminary system designs. Interact directly with top client personnel. Provide ongoing user advocacy and direction to development projects.

Qualifications:

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- **Working knowledge of Structured Analysis and Design**
- **Ability to communicate effectively with a wide range of business and technical people**
- **Writing/teaching experience a plus**

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Construct and enhance development and production environments. Participate in custom tailoring, installation, troubleshooting, performance evaluation and tuning, capacity/configuration analysis and planning for systems and communications.

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- **Understanding of the interaction between systems and applications**
- **Minimum 6 years experience**

Positions in Chicago, New York, and Phoenix

SEI offers top salaries, an imaginative personalized benefits package, unlimited opportunity for growth, and the challenge of working alongside other SEI consultants — the best in the business.

For confidential consideration, send detailed resume:

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SEI Information Technology
450 East Ohio Street
Chicago, IL 60611

Los Angeles:
Kathleen Radner
SEI Information Technology
5455 Wilshire Blvd.
Los Angeles, CA 90036

New York:
Gene H. Gessert
SEI Information Technology
Suite 1700
122 East 42nd Street
New York, NY 10168

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Richard E. Shuman
SEI Information Technology
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Phoenix, AZ 85012

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CCI currently has opportunities for:

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You will be responsible for software, systems administration, and operations for 32-bit super minis using UNIX* as software development systems.

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You will be a member of a team responsible for designing and developing an interactive transaction data management system. This includes an integrated data dictionary, query editor and advanced files access method. A non-procedural commercial application generator and forms manager provide easy-to-use facilities for end-users. The total system is integrated into PERPOS$_{\text{TM}}$, CCI's multiprocessor Power 5$_{\text{TM}}$ family of systems and office automation products.

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SENIOR SOFTWARE ENGINEER

You will be responsible for the design and development of PERPOS$_{\text{TM}}$, a UNIX-compatible fault-tolerant operating system.

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You will be the lead designer and developer of advanced R&D projects that will extend CCI's Power Series of fault-tolerant systems.

An advanced degree with extensive experience in UNIX operating system development are required. Additional experience with other operating systems and hardware system design is highly desirable.

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SYSTEM 38 PROGRAMMER/ANALYST

Peppermill, Inc., a multi-location company in Reno, Nevada, with activities in the restaurant, hotel, and gaming areas, is seeking an experienced Progammer/Analyst. The successful candidate will have a minimum of 5 years data processing experience and at least 1 year of RPG III programming. In addition, the candidate should also have good analytical skills so that they may work well in an independent environment. Experience in the restaurant, hotel, and/or gaming industry will be a definite plus. We offer an excellent starting salary and a full range of company benefits, including profit sharing. Qualified candidates should submit their resume, including salary requirements to:

Dick Eimer
Manager, Information Services
Peppermill, Inc.
3700 Grant Drive
Reno, NV 89509

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At National, we have one of the largest and most sophisticated timesharing environments in the Santa Clara Valley. If that's the kind of environment you're seeking, consider these immediate opportunities.

You'll be part of the NSC Timesharing Services Computer Center, which supports all of National's engineering and general VM timesharing user community. You will be responsible for Sysgens, I/O Gens, operating system maintenance/upgrades, problem resolution, performance monitoring and system tuning.

Your background should include a BS/BA in computer science, math or equivalent, and three to five years' experience in a large IBM or IBM-compatible main frame environment.

To apply for this position, please send your resume to National Semiconductor, Dept. LR, P.O. Box 62499, Sunnyvale, CA 94088, or call us at (408) 721-3004. We are an equal opportunity affirmative action employer. Principals only please.

Let's talk about your career.

National Semiconductor

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The Goodyear Tire & Rubber Company has openings for technical support people in the technical computing facilities at our Corporate Headquarters in Akron, Ohio. This facility is devoted exclusively to serving the corporate research, development and engineering community with a heavy emphasis on interactive and real-time systems. Education should include a B.S. degree in Math, Science or Engineering. Available positions include:

- IBM Systems Programmer: experience in MVS/TSO, VM/CMS, CICS, VTAM or TCAM required.
- DEC Systems/Application Programmers: experience in VAX VMS, communications, database, and real-time programming required.
- User Support: experience in interactive computing, VM/CMS, computer training, SAS, graphics and/or DSS tools required.

Send detailed resume and salary requirements in confidence to:

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Cherry Hill, New Jersey 08002
(609) 667-4488

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A lot has been written about Tandem's success. We pioneered fault-tolerant computing. Tandem systems offer unparallelled flexibility and networking capability. And our work environment has been cited as an example of corporate excellence.

But we couldn't have come as far as we have without exceptional people. In fact, our revenues have grown 33% in 1983. So, while we are growing rapidly—and have many opportunities for Sales Representatives, Systems Analysts, and Customer Engineers—we're still very selective about who we hire.

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Systems Analysts

We're looking for talented Systems Analysts to provide pre- and post-sales support, including sizing and configuration planning, design analysis, applications design, benchmarks, and technical presentations. You will also evaluate user education requirements, and generally plan smooth installations with our Sales Representatives. *Additionally, we're looking for experienced educators and design support personnel.* These positions require a minimum of 6 years' applicable experience, with a thorough knowledge of one or more of the following: OS internals, data communications protocols, database design, or project management in an on-line environment.

Sales Representatives

We're looking for Sales Representatives to work with customer upper- and executive-level management in FORTUNE 500-sized organizations to sell Tandem systems and aid in their installation. Your commissions will be limited only by your ambition. These outstanding opportunities call for aggressive, professional salespeople with over 5 years' proven ability to sell large business systems.

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To keep our systems performing flawlessly, Tandem is looking for Customer Engineers to work with cleints. Responsibilities include the installation, maintenance, troubleshooting and repair of Tandem systems, including peripherals and controllers. To qualify, you should have at least 5 years' extensive hardware support experience with large-scale computer systems.

How to apply

Western Division

To apply for positions in Northern California, call Janet Heckman at (415) 777-1230, or send your résumé to her attention: Tandem Computers, Inc., 4 Embarcadero Center, Suite 3000, San Francisco, CA 94111.

For positions in all other states west of the Rockies, call Lisa Deutschman at (408) 970-4386 or send your résumé to her attention: Tandem Computers, Inc., 2820 San Tomas Expressway, Santa Clara, CA 95051.

Central Division

Encompassing the entire Midwest as far south as Texas and as far east as Pittsburgh:

Send your résumé to Steve Slesnick, Tandem Computers, Inc., Two Woodfield Lake, 1100 Woodfield Road, Suite 450, Schaumburg, IL 60195; or call (312) 884-6684.

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Contact Mark Lynch, Tandem Computers, Inc., 12100 Sunrise Valley Drive, Reston, VA 22901.

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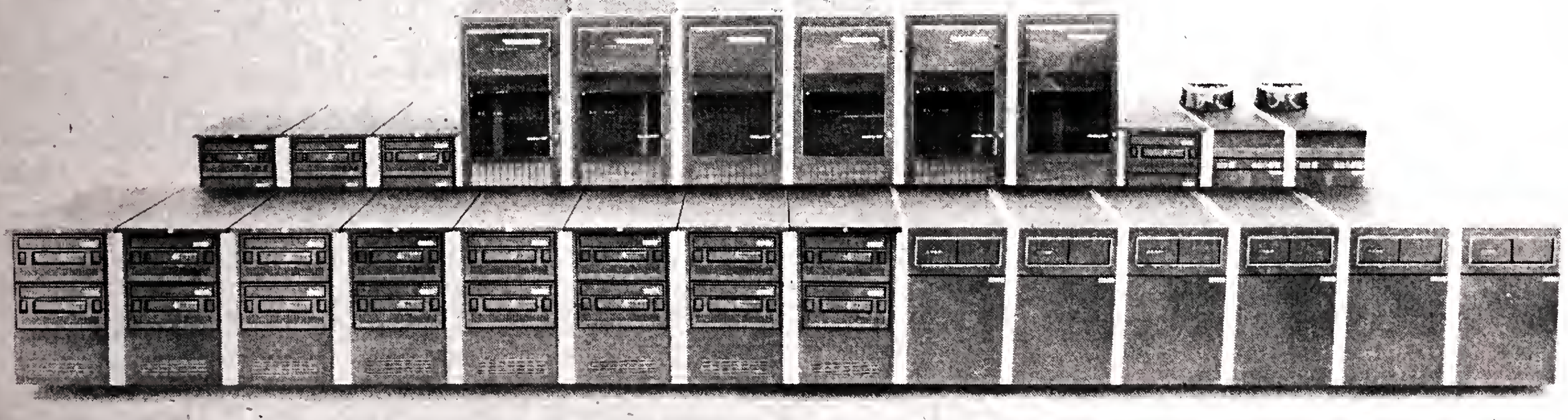
TANDEM



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Successful candidates will assume responsibility for manufacturing software support at customer locations, and provide education in manufacturing applications internally and externally. Qualified candidates must possess a minimum of 5 years' DP experience in manufacturing applications demonstrating a solid understanding of the user environment. Programming or system design experience and well developed interpersonal/communication skills are essential. Additionally, the ideal candidate's background will include combined experience in customer support, vendor application software, and software installation. Project leadership talent required. Openings are available in:

- **Los Angeles**
- **Cleveland**
- **Denver**
- **Edison, NJ**
- **Chicago**
- **Detroit**

DB/DC Consultants

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You'll be responsible for software installation and customer education, as well as database and applications systems design reviews, including interface with user management and technical representatives. To qualify, you must possess a minimum of 3-5 years' systems programming experience using Assembler on OS, DOS, MVS, VSE operating systems or several years as a database administrator involved in the design, implementation and testing/tuning of a database such as IMS, IDMS, or TOTAL. Teleprocessing background (CICS, IMS-DC, Shadow) would be helpful. Openings are available in the following cities:

- **Washington, DC**
- **Atlanta**
- **Charlotte**
- **Tampa**
- **Chicago**
- **Minneapolis**
- **Cleveland**
- **St. Louis**
- **Detroit**

Customer Support Manager

New York City

The successful candidate must possess 7-10 years' DP experience in a large IBM mainframe environment and 3-5 years' background in management to assume a key role managing a team of post-sales technical support specialists responsible for the implementation and installation of systems and applications software. You'll ensure customer satisfaction for an assigned group of major accounts, utilizing a strong marketing/business orientation, solid interpersonal/communication skills and familiarity with recruiting, hiring, training and expense control.

Marketing Support Representatives

Pre-Sales

These key positions throughout the U.S. require extensive systems level experience with IBM-based DB/DC software in an on-line environment. A solid grounding in operating systems is essential. Superior communication and people skills are a must. Vendor experience in supporting technical sales is a definite plus.

Candidates interested in challenging careers involving extensive travel may explore these and other opportunities throughout the U.S. by writing to C.H. Levy, Dept. CW-1984, Cullinet, 400 Blue Hill Drive, Westwood, MA 02090. Candidates for positions in this advertisement should include resume and **must** specify position of interest and geographic preference.

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Cullinet

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Dataserv Computer Maintenance is expanding nationwide. We now have immediate openings in major cities and will be adding more in the near future.

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For immediate consideration and more information call **Toll Free — 800-328-6729** or send your resume to: **Bev Walters, Dataserv Computer Maintenance, Inc., P.O. Box 3003, Hopkins, MN 55343.** We are an equal opportunity employer and all inquiries are considered confidential.

dataserv

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Challenging positions available for Sr. level Scientific Programmers to work at our Kenilworth or Lafayette, New Jersey sites. We require a BS/MS in Computer Science, Mathematics or related field. Candidates should have knowledge of INQUIRE, SAS, and TSO. Responsibilities will be diversified and directed to clinical research studies.

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Dynamic Control

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A small (700 full-time, 700 part-time) stable liberal arts college in North-central Illinois is seeking a Computer Scientist to fill a tenure-track faculty position. Applicants must: 1) Have a Master's Degree in Computer Science or a related field; 2) Have excellent teaching recommendations; 3) Be qualified to teach at least two of the following – BASIC, FORTRAN, PASCAL, COBOL, ASSEMBLY; 4) Be qualified to teach upper division computer science courses. Preference will be given to candidates with any of the following: 1) Expertise in DBMS, Business info systems, Systems analysis and design; 2) Computer graphics; 3) CAD/CAM; 4) Ability to teach Mathematics-/Statistics; 5) A doctorate in Computer Science or related field; 6) Computer-related experience outside of an educational institution.

Duties will consist of teaching approximately 12 hours/week/semester, advising students, and contributing to the development of young (four years old) Computer Science Department. Present computing facilities include an IBM 4341 Model 2 with CP and MUSIC operating systems, two disc drives, one tape drive, two printers, 25 terminals (with color graphics), and ten microcomputers.

Rank and salary competitive and based upon qualifications. Attractive benefits program. Send vitae, credentials, and three letters of recommendation to: Dr. Gordon Wesner, Vice President and Dean of the College, Rockford College, Rockford, IL 61108-2392.

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ROBERT HALF
OF LA Personnel Services
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Programming

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International engineering firm has the following positions open for its PRIME computer facility in Saudi Arabia supporting payroll, accounting, supply and general MIS applications.

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Minimum of 3 years' FORTRAN programming experience with emphasis on financial applications. Familiarity with PRIME or equivalent mini-computer system desirable. Degree required.

Benefits package includes:

- Furnished housing
- 6 day R&R to Athens
- Severance pay
- 2 weeks vacation
- Paid health and life insurance
- All transportation provided

Positions involve 1 year single status contract.
U.S. citizenship is required.
Please send resume to Dept. K-006.

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of New Mexico
P.O. Box 3320
Albuquerque, NM 87190
(505) 884-4557

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Nashville, TN 37217
(615) 361-4900

ST. LOUIS

RPG II PROGRAMMER/MGR

Southern Missouri manufacturer seeks individual with 2 yrs experience who will program in RPGII and manage the DP dept. Will work on development in a System 34 environment. To **$27,000**

EDX/EDL SYSTEMS ENGINEER

St. Louis service firm seeks an experienced software engineer. Requires 6 years systems experience, demonstrated success in software design architecture and implementation of major system or subsystem, 16 Bit Mini/Micro Real-Time distributed data processing communications network environment. **$30-50,000**

PROJECT MANAGER

Large, dynamic firm in St. Louis seeks Individual with Series 1 background with COBOL OS/MVS in financial systems. CICS or BAL is a plus. To **$38,000**

COBOL PROGRAMMER/ANALYSTS

Expanding Midwest service firm seeks individuals with structured techniques and 3-4 yrs of COBOL in an OS/MVS environment. To **$31,000**

SR SYSTEMS ANALYST

Dynamic firm seeks an experienced systems analyst with a background in project management. Requires 3-5 yrs of COBOL with CICS. Good written and verbal communication skills a plus. To **$38,000**

Randy Pace - Warner Coffman
ROBERT HALF
of St. Louis
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1535

SEATTLE

EDP AUDITOR

Seeking individual with 3+ years experience as EDP auditor in manufacturing environment. Experience in IBM IMS COBOL shop ideal. Opportunity for advancement into general dp management position. Mid **$30's**

S & P MANAGER

Area firm seeks S & P manager with experience in distribution industry. Must have experience managing large group of P/A's. IBM mainframe experience ideal. Salary Open

IMS SYSTEMS PROGRAMMER

Seattle headquarters of national firm seeks individual with 3 or more years experience supporting IMS and CICS. Responsibilities will include capacity planning and data base application design reviews. Excellent company which strongly supports its data processing function. Salary **DOE**

DATA BASE ANALYST

Seeking analyst with experience using COBOL in IBM OS environment and 2+ years DL/1 to join data base group. This is an excellent opportunity to learn the fine points data-base design from a master. **$26-30,000**

IDAHO

DOS SYSTEMS PROGRAMMER

Idaho firm seeks individual with 3 or more years experience supporting IBM DOS/VSE under VM. Telecommunications and some application programming experience helpful. **$28-32,000**

Marjie Peterson
ROBERT HALF
of Seattle, Inc.
600 University St. #2328
Seattle, WA 98101
(206) 264-9000

MILWAUKEE

EDP CONSULTANT

Dynamic! This describes both the company and the individuals they are seeking. Requires 3+ years systems experience. Will be working or consulting staff of large public accounting firm. Must have desire to excel. **$28-38,000**

SOFTWARE PROGRAMMER

Corporate data center seeks seasoned technical expert to support its DOS/VSE system. Opportunity to gain integrated knowledge as system migrates under VM to MVS. Requires 3+ years VM, CMS & DL/1. **$29-39,000**

Brian Krueger or Dick Bird
ROBERT HALF
of Wisconsin
777 E. Wisconsin Avenue
Milwaukee, WI 53202
(414) 271-HALF (271-4253)

SAN ANTONIO

SYSTEMS PROGRAMMER

Degree preferred not req'd. 3+ yrs actual exp in Series 1 EDX-RPS performance area is a MUST. Audio response - Personal computer exposure a PLUS. Benefits are excellent - 4 day work week, Credit Union, pension, profit sharing, etc. Professional growth potential is superb. **$29-32,000** + Bonus

NETWORK ANALYST

Degree preferred not req'd. Must have good knowledge and working ability with SNA-VTAM (Gens and Dumps), Data set, modems, communications HP/IBM environment. Position is due to expansion - with exceptional opportunity to learn and grow both prof/earnings. **$30-33,000** + Bonus

All positions above and many more are in Texas where "Long Necks," "Armadillos" and the "Cotton Eyed Joe" call home.

Bob Baldauf
ROBERT HALF
of San Antonio, Inc.
6243 IH 10 West, Suite 850
San Antonio, TX 78201
1-800-531-5402
In TX Dial (512) 736-2467

AUSTIN

SOFTWARE ENGINEERS

Assembly language. Knowledge of computer graphics, device drivers, programmable controllers or control systems. **$42,000**

INSURANCE EXPERTS

IBM mainframe experience, COBOL or Assembly language. **$37,000**

SYSTEMS PROGRAMMERS

OS/MVS or DOS/VSE experience. Multiple opportunities. **$38-48,000**

DATA BASE EXPERTS

IDMS DB/DC or IMS DB/DC preferred. **$42,000**

John P. O'Keefe
ROBERT HALF
of Austin, Inc.
400 E. Anderson #334
Austin, TX 78752
(512) 835-0883

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P/A's

Univac 1100 w/ on-line apps, DMS1100/DDL/DML/MRP/shop floor control. **$40,000**

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Data base exp w/DDL/SDDL/QLP/DMS prog/logical & physical DB design. Openings in analysis, design & admin. **$40,000**

ROBERT HALF
of New Orleans
P.O. Box 57629
New Orleans, LA 70157
(504) 835-4296

SAN FRANCISCO

SR SYSTEMS ANALYST

City firm seeks individual w/ 5-7 yrs DP and supervisory experience on IBM4300/DOS, COBOL. Hands on experience w/DBMS manufacturing system and MRP modules required. **$38,000**

PROGRAMMER ANALYST

Peninsula firm seeks individual w/ 3+ yrs DP exper w/ knowledge of acctg pkgs: MSA, ISA, ABC to work on appl dev team. OS/JCL, VSAM exper w/good debugging skills preferred. **$30,500** midpt

COMPUTER SERVICES MANAGER

City firm seeks individual w/ 3+ yrs supervisory operations exper. IBM preferred. Mainframe required. Telecommunications, data entry and control helpful. Mid **$30's**

SR ANALYST

Peninsula firm seeks individual w/ 5-7 yrs exper in financial &/or insurance appl in IDMS (3 yrs min), COBOL/OS envir. **$37,000** midpt

PROGRAMMER ANALYST

City firm seeks individual w/2 yrs min Command CICS, familiar w/ VM envir (CMS). DOS/VSE, JCL, VSAM. Sys prog exper a plus. **$25-30,000**

PROG ANALYST II

City firm seeks programmer w/ 3+ yrs HP 3000/COBOL exper to work in development. **$28-32,000**

ASST TO ADMIN OFFICE AUTO

City firm seeks individual to assist Administrator in all areas of DP, WP and acctg. Telecommunications and DP user exper on IBM/38 plus Micros helpful. **$30-40,000**

Patricia Brown
ROBERT HALF
of Northern California
111 Pine Street, 15th Floor
San Francisco, CA 94111
(415) 434-1900

WASHINGTON

EXPANDING DATA CENTER

Growth opportunity in the nation's capitol! Rapidly expanding DC based firm seeks several experienced programmer/analysts. COBOL required. CICS preferred. Excellent benefits including tuition assistance. **$30,000**

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7316 Wisconsin Ave.
Suite 401
Washington, DC 20814
(301) 652-1960

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SOFTWARE SPECIALISTS

Progressive companies offer 3 tech careers. Senior MVS person for leadership role in conversion. To **$40,000**

Promotable tech specialists, MVS preferred, ACF/VTAM accepted. To **$37,000**

DOS/VS or VSE staff position, will train person with 1-2 years sysgens. **$25-30,000**

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of Western Michigan, Inc.
Suite 302, 180 Division N.
Grand Rapids, MI 49503
(616) 458-2333

BOSTON

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Fast-track $2B firm seeks proven mgr to oversee the DBA & tech support depts. Multi-CPU IBM OS/MVS IMS DB/DC shop. Super oppty to manage tech growth of fast paced org. **$55,000**

OS/MVS SYS PROG

Prestigious fin'l svcs co offers challenging oppty for BAL internals pro. You should have solid networking knowl in an IBM OS/MVS IMS environ. Upward mobility for the internals specialist. **$35,000**

IMS TEAM LDR

Exciting career oppty awaits the tech skilled ldr. You should have strong IBM OS/MVS IMS DB/DC COBOL bkgrd for this Fortune 500 org. Hvy admin/tech involvement with development tech support grps. **$35,000**

ROBERT HALF
of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200

PROVIDENCE

SOFTWARE DEVELOPMENT

Natl software devel co seeks Sr P/A w/TOTAL data base and/or Mantis on-line exp. Lge IBM syst exposure. Retail syst know a plus. Trvl involved. **$35,000**

ROBERT HALF
of Providence, Inc.
76 Westminster Street
Suite 900
Providence, RI 02903
(401) 274-8700

NEW YORK

PROJECT LEADER IBM/BAL

Prestigious fin'l service org has situation for top-flight candidate to assume responsibility for support of sophisticated acctg & fin'l reporting systems. This successful candidate will supervise small staff, in addition to heavy client contact in training, customizing and enhancing products. In-depth BAL programming exper coupled with JCL and access methods. Outstanding oppty with growth to manager position. Fee Paid. **$38,000**

SYSTEMS PROGRAMMER TRAIN MVS

NYSE listed mfg in central NJ. 2+ yrs CICS exper required along with MVT or VSI background to qualify for MVS training. Some applications programming also essential. This 3083 installation is expanding and moving into telecommunications. Excellent growth & learning oppty. Fee Paid. **$38,000**

ROBERT HALF
of New York, Inc.
522 Fifth Avenue
New York, NY 10036
(212) 221-6500

SOUTHERN CALIFORNIA

PROGRAMMER ANALYST

Multiple openings for IBM COBOL P/A's with good CICS in financial and mfg environments. To **$35,000**

ROBERT HALF
of L.A.
3600 Wilshire, #2000
Los Angeles, CA 90010
(213) 386-6805

HARTFORD

CAD/CAM

Multiple openings for indivs w/3+ yrs exp in CAD/CAM sys. These positions inc tech dev & sales. Suburban setting, full reloc, + many perks. **$45,000+**

IMS DB/DC

Outstanding oppty for indiv w/DB/DC. Must have exp in logical/physical Data Base design & strong tech skills. Suburban loc, many extras. **$45,000**

LIFE SYSTEMS

Multiple sys opptys for exp'd prog's sys/analyst & proj ldrs for CT clients expanding 1984 req. These are on-line devel using IMS & CICS. **$39,000**

DATA BASE (IMS or IDMS)

New position in small group to formulate data base design, modeling & architecture for long-range corp planning. 3 yrs exp in data base qualifies for this hi-vis staff position. **$38,000**

SR SYS ANALYSTS

CICS, COBOL & BAL or CICS appl bkgrd req'd for Sr lvl opptys fin'l svcs co for indiv seeking more devel projs. **$35,000**

MFG SYSTEMS

Sys analysts & proj ldrs req'd for growing mfg co. Bkgrd should incl IBM DOS/VSE or HP3000 & Data Base exp. Oppty to install distrib sys in US & overseas. **$42,000**

ROBERT HALF
of Hartford, Inc.
111 Pearl Street
Hartford, CT 01603
(203) 278-7170

BUFFALO

SYS-38 P/A

Join prof staff supporting newly installed IBM Sys-38 in upstate NY. Ideal app has at least 3 yrs in RPG III in either Sys-3 or 34 data ctr. Exposure to RPG III a +. Addit exp in mfg helpful. A small DP ctr in a lge corp. **$28,000**

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1310 Liberty Bldg.
Buffalo, NY 14202
(716) 842-0801

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An exciting and growing company offers you a challenging, state-of-the-art environment where your ability in interpersonal relationships are as important as your technical abilities. Company offers fast advancement. All new development. Requires 2+ yrs IBM, COBOL, MVS and programming exp. Job #4832. Salary **$25-35,000**

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John Miller
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KING SAUD UNIVERSITY
ABHA BRANCH
ABHA SAUDI ARABIA

COMPUTER CENTER

The Department of Computer at King Saud University, Abha Branch has available the two following positions for the Academic Year 1983/84 which starts Febuary 1984

A. **COMPUTER SERVICE MANAGER**

QUALIFICATIONS REQUIRED

- Full Knowledge of Arabic language (reading and speaking
- Master Degree in Computer Science
- Several years of working experience in computer center
- Ability to recruit and train new staff
- Knowledge of MUS

JOB DESCRIPTION

- Managing the Computer Center
- Teaching some computer courses
- Training personnel for the computer center
- Improving computing facilities
- Developing computer programs for the University Branch Administration and the College

B. **PROGRAMMER**

QUALIFICATIONS REQUIRED

- Bachelor Degree in Computer Science
- Minimum of two years relevant experience
- Arabic knowledge will be an advantage but not conditional

JOB DESCRIPTION

- To assist in Programming Courses
- To assist in Training new staff
- To contribute the development of administrative system and scientific programs

THE BENEFITS OFFERED BY THE UNIVERSITY FOR THE TWO POSITIONS ARE:

- Free roundtrip airline tickets annually for the employee and his family
- Furnished accommodation or housing and furnishing allowance
- Monthly transportation allowance
- Relocation allowance
- End of service gratuity
- Free Medical and Dental care covering family
- Contribution by the Univeristy to cover tuition fees for non-Arabic-speaking children

Intended Applicants are kindly requested to send their application letters indicating the position applied for together with photocopies (non-returnable) of their academic diplomas and specialized experience certificates, and an updated resume to the following address:

KING SAUD UNIVERSITY
ABHA BRANCH
COMPUTER CENTER
P.O. BOX 418
ABHA — SAUDI ARABIA

A second copy of the above mentioned information should also be mailed to

KING SAUD UNIVERSITY OFFICE
2425 WEST LOOP SOUTH #450
HOUSTON, TEXAS 77027
Attention: Ms. Nikky Amin

Qualified candidates should furnish their correct addresses and telephone numbers where they can be reached for notification of place and date of scheduled interview.
Applications will be held in strict confidence.

EXPERIENCED MIS PROFESSIONALS & EDP AUDITORS

DOMINION BANKSHARES CORPORATION, a $3.2 billion multi-bank holding company with 150 offices throughout Virginia, is seeking **experienced** MIS Professionals and EDP Auditing Professionals to staff our growing needs in Roanoke, VA.

Our computer center utilizes large scale IBM mainframes and a statewide communications network in support of our bank and bank related offices.

QUALITY ASSURANCE ANALYST

This position requires a BS Degree (preferably Computer Science), 3-5 years data processing experience and a systems analysis background. A technical and analytical aptitude, an IBM hardware/software background and the ability to communicate effectively with MIS personnel and user departments is desired. Experience in quality assurance and banking is a definite plus.

PLANNING ANALYST

Our Information Systems Planning Division is seeking an individual to work on developing an overall office automation scheme and the MIS strategic plans. This position requires a Bachelor's Degree (Masters preferred), an ability to communicate both orally and in writing and superior planning and organizational skills. A background in banking would be a plus.

PROGRAMMER/ANALYSTS

Our Applications Systems Division has openings for experienced Programmer/Analysts. Banking systems experience in CPCS, Deposits, CIF or Loans Systems as well as 2 or more years of COBOL programming is preferred. A Bachelor's Degree in Computer Science is a plus.

EDP AUDITOR

This position requires a BS Degree, 3 years of EDP auditing experience and prior experience in auditing banking systems under development for the adequacy of the system of internal controls. A knowledge of MVS, JCL, CICS, ACF2, COBOL, ROSCOE, Easytrieve and banking systems is highly desirable.

DOMINION BANKSHARES CORPORATION offers a wide variety of benefits including medical, dental and life insurance, a pension plan, a savings plan, a stock purchase plan, relocation assistance and competitive performance based salaries. **For confidential consideration, call John Sanders at (703) 563-7952 (COLLECT) or send your resume, with a cover letter indicating your salary requirements and the position you are interested in, to: John R. Sanders, Jr., Professional & Technical Recruiter, (CW),**

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Bankshares
Corporation

DOMINION BANKSHARES CORPORATION
P.O. Box 13327,
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Information Systems Opportunities

The continued growth of Fleming Companies, one of the nation's largest wholesale food distributors, has created the need to expand our Information Systems team at our new and expanded corporate offices in Oklahoma City.

Programmer Analyst

3-5 years COBOL programming experience, DOS/VSE, VSAM and JCL. IBM 4331 hardware. Willing to travel 25%.

Systems Programmer

4 years experience with 1-2 years systems programming environment. Desired skills include DOS/VSE generation and maintenance; VM/370; CICS; VSAM; PANVALET/OWL; DYNAM/T. Willing to travel 25%.

Benefits Package

Fleming offers one of the best in the industry, including company paid medical, dental and life insurance, profit sharing, pension and stock purchase plans as well as our new "Stock Share" and 401K "Savings Plus" plans.

Call now! Join a company with a dynamic past and promising future. To schedule an interview, call Greg Belsheim, at (405) 840-7308, 8am - 5pm weekdays, Tuesday and Thursday until 8pm. If you are unable to call, send your resume with salary history to: Greg Belsheim, Fleming Companies Inc., P.O. Box 26647, Oklahoma City, OK 73126.

Fleming
Companies, Inc.

Equal Opportunity Employer M/F

BUSINESS APPLICATION PROGRAMMERS

Raytheon's Equipment Division Information Processing Systems (IPS) has immediate openings for Business Application Programmers with a college degree and 2-5 years experience. Hardware utilized is an IBM 3081 G, operating in an OS/MVS environment. Software/Languages utilized are primarily COBOL, IMS DB/DC, ROSCOE, LIBRARIAN, OS/JCL and utilities.

IPS is involved in the development of Engineering, Manufacturing and Financial Business Systems, plus the evaluation and selection of user-friendly Decision Support Systems. Design/Development Methodologies and automated software generation tools are utilized to support system development.

Please forward resume and salary information to Bob Nelson, Dept. 1-9, Raytheon Equipment Development Laboratories, 528 Boston Post Road, Sudbury, MA 01776.

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EQUIPMENT DIVISION

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DIRECTOR OF MANAGEMENT INFORMATION SYSTEMS

Join the nation's largest retailer of brand name consumer electronics where top management is strongly committed to MIS and currently has state of the art POS and on-line systems.

Wards Company, Inc. is looking for a bright, enthusiastic, high level individual for this key position. Requires strong systems analyst who has background in programming and possesses good oral and written communications skills.

Experience managing multiple concurrent development teams is a plus.

Wards is a fast growing company and is looking for a person who wants a growth opportunity, with the challenges it provides. Highly competitive salary, fringes, and bonus.

Send resumes or request more information from:

Wards Company Inc.

Wards Co. Inc.
2040 Thalbro Street
Richmond, Va. 23230
(804) 257-4360

SENIOR PROGRAMMER DEC/VAX

SPSS, Inc., a world leader in the development of quality statistical software, has an immediate career opportunity for a creative programmer to become part of its highly skilled team in the Northfield, Minnesota Division.

The ideal candidate will have at least two years of experience programming large scale scientific applications on a DEC/VAX under VMS, a working knowledge of VAX Macro and a background in software performance. Experience with software design and at least one higher level language preferred.

We offer a creative, progressive work environment and a competitive salary and benefit package. Northfield is a pleasant college town located less than one hour's drive from Minneapolis. Interested individuals should forward their resumes to:

SPSS inc.

SPSS, Inc.
Northfield Division
402 Washington Street
Northfield, MN 55057

An equal opportunity employer

PROGRAMMER ANALYST

Hitchiner Manufacturing Company is progressing toward a totally interactive information system environment with newly acquired HP-3000 systems.

We are looking for a Programmer Analyst to join us in the development of major integrated custom manufacturing and general business applications. Two years programming experience is a minimum requirement. HP-3000, RAPID software, and/or manufacturing applications experience desirable.

Join Hitchiner and enjoy a competitive salary, a benefit package that includes medical/dental coverage, tuition reimbursement and profit sharing, and excellent potential for growth. We also provide relocation assistance to New Hampshire's mountain country, where low taxes and a relaxed lifestyle make this one of New England's most desirable locations. Send your resume and salary requirements today to: **Hitchiner Manufacturing Company, Inc., Personnel Dept., P.O. Box 2001, Elm Street, Milford, N.H. 03055**

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POSITIONS AVAILABLE

Instr. or Asst. Prof in Quant. Methods/Comp. Sci., Fall 1984; 2 of 3 tenure track. Areas: telecommunications or comp. sci. plus 1 or 2 of: stats, DBMS, languages, digital electronics, op. systems, compiler/assembler construction, data structures, systems software, MIS, systems design. Qualifications: PhD or Master's with teaching exp. and/or substantial prof. exp.; competent to teach undergraduate level courses (stats, D.P., BASIC, FORTRAN, COBOL, PASCAL), adv. courses (DBMS, systems software), courses in the evening MBA program (stats & seminars) and the evening undergrad QM/CS degree and certificate programs. St. Thomas is a Catholic Liberal Arts College with an undergrad. day and evening division, an evening MBA program, and a Grad. Educ. program. Send resume by 2/15/84 to Dr. B. Folz, Chair, QM/CS Dept., College of St. Thomas, St. Paul, MN 55105.

Programmer/Analysts

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Fairfield County, Connecticut

We're TSI International, one of the world's largest proprietary software product vendors. With over 2000 clients worldwide and more than a decade of experience, our industry reputation for quality software products and services has been firmly established. Our people have made the difference.

We've gained our position in this industry by hiring and developing the best professional talent in the business. DP professionals who do not simply want to be locked behind a tube. People who excel in an environment that provides continual variety and challenge. In short, professionals who not only possess the sense of invention necessary for ongoing software product development, but who also enjoy being the technical backup for our field marketing staff and clients as well.

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We expect 1984 to be a year of continued growth for TSI and our employees. If challenge and variety appeal to you, look into several positions currently available in our Wilton, Connecticut headquarters.

Software Product Specialists

As a Product Specialist at TSI, your role will encompass both software development and support. You will participate in all phases of the software business including the design, coding, testing, debugging and maintenance of proprietary software packages. Additionally, relying upon your strong written and verbal communication skills, you'll provide high level customer and sales support.

As a member of a small, cooperative team, you will represent an advanced software product sold to the IBM (Honeywell or Univac) mainframe environment. Products that include database design tools (Facets); data dictionaries (Data Catalogue 2); storage and retrieval systems for CICS (Docu/Master); and other technologically advanced software tools in the beginning stages of development.

To qualify, you should have 3-5 years of COBOL programming experience in an on-line, IBM environment. Exposure to DBMS (IMS, TOTAL, ADABAS, ETC.) along with some working knowledge of BAL and CICS (command or macro) will be necessary. For one of our positions, experience with large Univac systems is desirable.

In return, we'll offer you a whole new world of varied assignments and opportunities. You will be in the position to make a difference, to become a key contributor to the growth of the team and the company. Additionally, we'll provide you with generous medical, dental, tuition and profit sharing benefits. For immediate consideration, send your resume to C.P. Baen, Mailstop #11, TSI International, 187 Danbury Road, Wilton CT 06897

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INTERNATIONAL ATOMIC ENERGY AGENCY SYSTEMS PROGRAMMER

The International Atomic Energy Agency seeks a highly experienced Systems Programmer for its Computer Section - Systems Group.

Required: University degree or equivalent plus 6 years' relevant practical experience in data processing in a large IBM environment and experience with TSO, JES2, ACF2, SMP and IBM program products. Some working experience in technical project management, current telecommunication technology, computer architecture, programming languages, and various operating systems are also prerequisites.

Presently: The Agency has a dual IBM 3032/3081 MVS/SP configuration with JES2, ACF/VTAM, TSO/SPF, CICS, STAIRS and ADABAS and provides a variety of computer services to the United Nations organizations based in Vienna, as well as world-wide networks for information retrieval.

Initial contract for two years, tax-free emoluments depending on experience and qualifications approx. $ 32,000 - 34,500. Additional allowances for dependants. Travel and removal expenses paid. Six weeks annual leave. Send curriculum vitae with an indication of your nationality, under Vacancy Notice No. 103/83, to the Division of Personnel, International Atomic Energy Agency, P.O. Box 100, A-1400 Vienna, Austria.

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Several well established client firms in coastal and interior areas seek Analysts and Systems Analysts with experience on IBM 4341, 3081 or similar equipment with expert knowledge of OS/MVS, JCL, CICS, IMS, VM/CMS or COBOL. Also HP3000, DEC 11/780, IBM S/34, 36, 38 in great demand.

All fees, interview and relocation costs paid by client company. Send confidential letter or resume to: Sheehy Associates, Inc., Suite M, 465 Congress St., Portland, Maine 04101.

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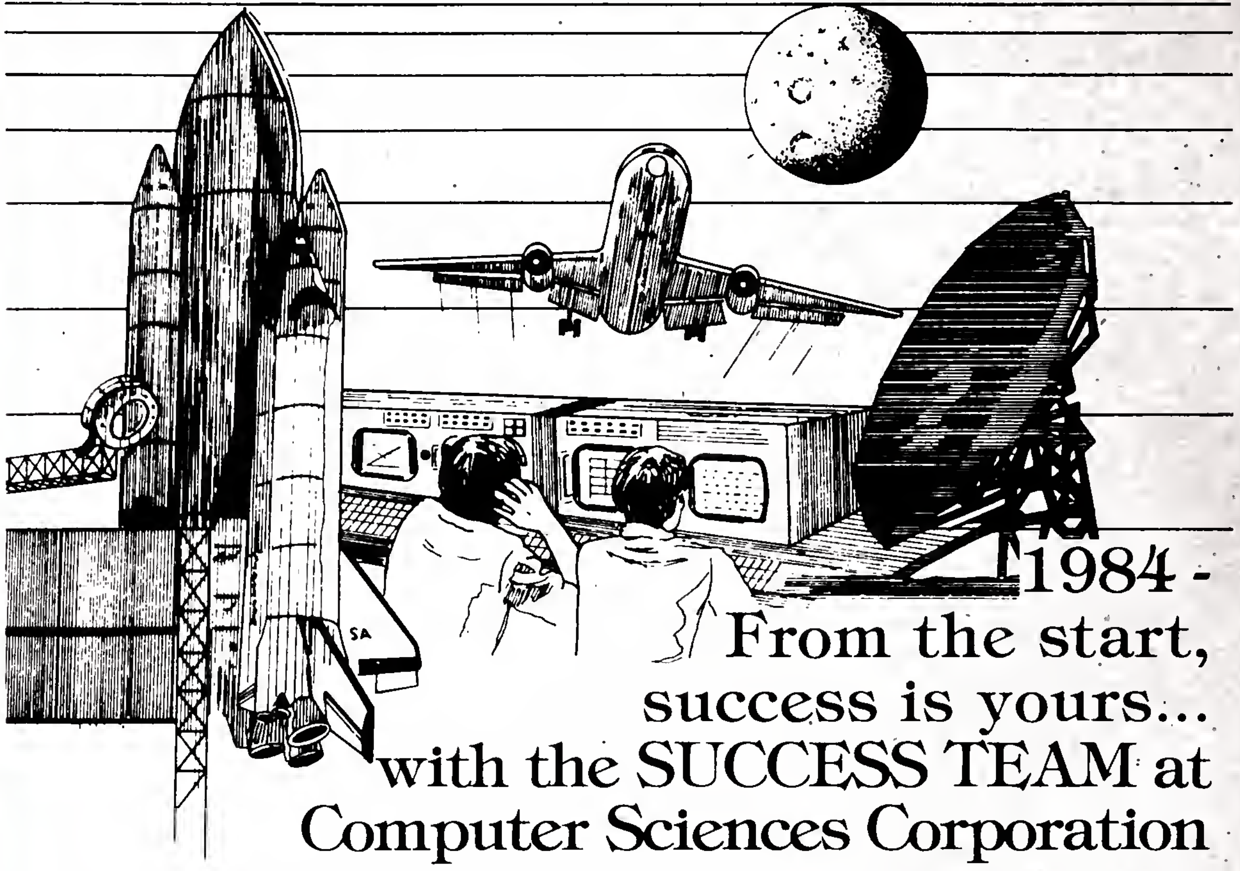

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Immediate openings are available for computer professionals with Bachelor's or advanced degrees in Mathematics, Physics, Astronomy, Electrical Engineering or Computer Sciences. If your background includes solid experience in FORTRAN or Assembly Language and you have worked with state-of-the-art Computer Systems utilizing sophisticated Programming Applications and Software Engineering techniques, you are encouraged to make 1984 your most professionally and personally rewarding year yet.

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BGS

The premier company in computer capacity management software seeks an experienced professional to participate in its continuing success. Our integrated family of capacity management software - BEST/1, CAPTURE, INFO/BASE, and CRYSTAL - is effectively serving the needs of over 500 large IBM facilities, worldwide. Projected demand for both existing and to-be-released products is extremely high. We have an immediate need for a:

DEVELOPMENT MANAGER FOR MVS PRODUCTS

The successful candidate will assume responsibility for leading a team of systems and programming specialists in defining and developing extensions to our performance modeling and computer performance evaluation products for the large-scale MVS user community. A strong technical background in MVS is required, as well as a proven ability to manage systems professionals.

Remuneration for the position is extremely attractive as are BGS professional atmosphere, flexible work schedules, easily accessible location, and a full benefits package, including medical/dental coverage and tuition reimbursement.

Please respond to Sherienne Rist. Personnel Administrator.

BGS SYSTEMS, INC.
One University Office Park
Waltham, MA 02254
(617) 891-0000

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Tenure-track position requires minimum of M.S. Computer Science and commitment to quality teaching. Experience and related mathematical skills preferred. Teaching courses in introductory and advanced computer science in Day and Evening Divisions. Load 3·1·3. Salary negotiable. Deadline: March 1 or until position is filled. Applications: Dr. Rita Murray, Dept. Mathematical Sciences, Russell Sage College, Troy, NY 12180 (518/270-2328).

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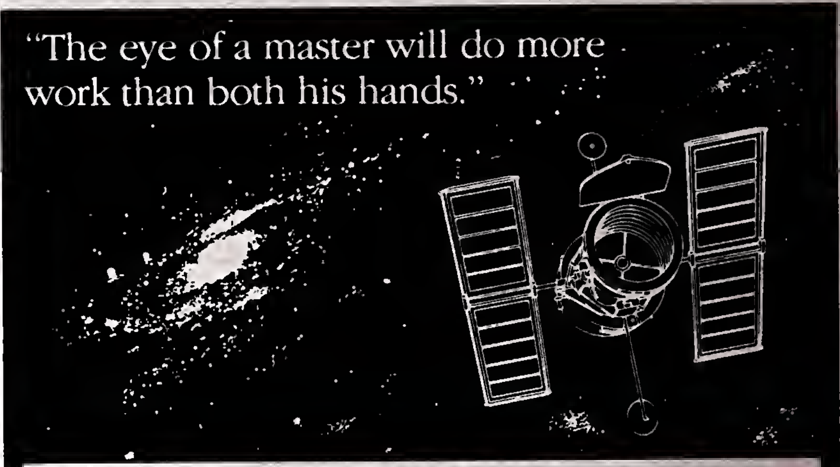
MUMPS

If you have it, we want you!

Healthstat, a subsidiary of Brockton Health Corporation, has an immediate opening for a Programmer/Analyst with experience programming MUMPS language. We offer a competitive salary and benefits package. Resumes only, and salary history to: Lois Salvatore, Personnel Specialist.

Brockton Health Corporation
680 Centre Street
Brockton, MA 02402.


"The eye of a master will do more work than both his hands."

The ST ScI, located on the Homewood Campus of the Johns Hopkins University, is seeking dynamic and knowledgeable professionals for its activities within the challenging Space Telescope development and implementation program. The Institute is an academically based, non-DOD organization under contract with NASA.

QUALITY ASSURANCE MANAGER (SOFTWARE)

Responsible for development and implementation of a quality assurance program for large software development projects, documentation, hardware development, and data operations. Experience with software QA techniques and practices expected, including DOD-STD-1679A, MIL-S-52779A, MIL-Q-9598, IEEE 730. BS in engineering, Computer Science, or Mathematics.

ENGINEERING

Responsible for knowledge of instruments onboard ST, involvement with pre-launch testing, orbital and science verification of instruments, and monitoring technical and scientific performance of instruments. Experience with complex space scientific experiments, areas of electronics, on-board computers, real-time programming, high voltage preferred. BS in engineering or Computer Science.

ST ScI offers competitive salary, excellent benefit package and relocation assistance. Submit resume and salary history to: Space Telescope Science Institute, Personnel Dept.—8422, Homewood Campus, Baltimore, MD 21218.

An Equal Opportunity/Affirmative Action Employer, M/F/H/V

SPACE TELESCOPE SCIENCE INSTITUTE
SPACE TELESCOPE SCIENCE INSTITUTE
Homewood Campus Baltimore, MD 21218

High Tech '84 Opportunities $30,000-$65,000+

The coast-to-coast Fox-Morris recruitment network has placed thousands of hi-tech executives in key positions with leading companies during more than two decades. A few examples of choice 1984 opportunities include:

SYS. DVLPMT. CONSULTING. $50K+. Big 8 clients seek fast-track design/dvlpmt. pros for hi-level assignments.
M. Feiger. New York.

MGR., LIBRARY AUTOMATION to $48K. MLS w/tech undergrad to acquire. staff & implement. corp. on-line research facility.
J. Clark. McLean.

BUSINESS SYSTEMS ANALYST to $45K. Key planning role w/int'l. flavor. Ideal oppty. for recent MBA/micro enthusiast.
J. Clark. McLean.

OP SALES. $40K+. Exp'd. HW. SW sales pros in hvy. demand. Mains. minis. micros.
M. Feiger. New York

OPERATIONS MGR., $40K. 3033 MVS shop seeks strong mgr. to take charge.
H. Greene. Phila.

DEC SYSTEMS to $40K. Multiple openings w/defense contractor
J. Clark. McLean

CONFIGURATION MGMT., $34-40K. Capacity planning. change mgmt. & research/acquisition exp. Lg. IBM MVS/IMS.
A. Thomas. Cleve.

TRUST SYSTEMS. $35K. Hi-caliber analyst w/strong financial/trust/portfolio systems exp.
H. Greene. Phila.

MINI SYSTEMS. $35K. Oppty. for technically strong prog./analysts w/exp. w/PRIME. DG. DEC. Fortran. PL-1.
H. Greene. Phila.

INFO. SYSTEMS AUDITOR to $35K. Help pace new sys. dvlpmt. & emerging technologies.
G. Nugent. McLean.

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PHILA., PA 19102—1500 Chestnut St., **215-561-6300** (H Greene)
ATLANTA, GA 30346—47 Perimeter Ctr., **404-393-0933** (D Desmond)
BALTIMORE, MD 21204—409 Washington. **301-296-4500** (C Newman)
CHARLOTTE, NC 28281—1350 Johnston Bldg., **704-375-0600** (L. Stone)
CLEVELAND, OH 44131—4401 Rockside. **216-524-6565** (A Thomas)
DALLAS, TX 75240—5501 LBJ Freeway. **214-934-2350** (P McLaughlin)
HOUSTON, TX 77098—3000 Richmond. **713-523-5588** (R Myers)
McLEAN, VA 22102—8200 Greensboro. **703-790-1335** (G Nugent)
NEW YORK, NY 10119—One Penn Plaza. **212-947-4400** (M Feiger)
NEWTON, MA 02159—189 Wells Ave. **617-332-6960** (A Gelb)
ORANGE, CA 92668—505 City Parkway West. **714-634-2600** (J LaBorde)
PITTSBURGH, PA 15222—4 Gateway Ctr., **412-232-0410** (M Leety)
RALEIGH, NC 27625—3101 Poplarwood Ct., **919-872-2940** (M Hunter)
SAN FRAN., CA 94111—601 Montgomery. **415-392-4353** (J Ozag)

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or Call Collect Bill Mallory (413) 781-3412

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Our Corporate objective is the integration of a nationwide private X.25 network with traditional communications protocols, to support short response time inquiry applications and store and forward batch transmission applications.

To achieve our objective, we are looking for several high-technology professionals who; perceive the challenges we face, have implemented solutions in these areas and would value the opportunity to engage in technically challenging work.

If you have in-depth quality programming experience in and an understanding of:

- **development and integration of user invented systems software with vendor software**
- **real time distributed processing**
- **remote interface processors**
- **telecommunications network implementation**

and you:

- **have technical excellence as a career objective**
- **thoroughly enjoy the freedom to work toward simple solutions to complex problems**
- **take prideful responsibility for your creations**
- **have a history of successful project implementation**

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Send us, in strict confidence, your latest resume, handwritten update or comments and present cash compensation. If you don't have a resume, feel free to call and leave your phone number(s) -- we will respond.

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MASTERCARD INTERNATIONAL, INC.
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St. Louis, Missouri 63146
(314) 434-6680 extension 215

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RESEARCH AND DEVELOPMENT PROGRAMMER ANALYST

PPG Industries Chemical Group has an opening for an experienced scientific programmer analyst at its Barberton, Ohio Technical Center. Located adjacent to Akron, Ohio, Barberton combines the advantages of a small town lifestyle with the cultural advantages of a major metropolitan area. PPG is a major producer of both commodity and specialty chemicals and provides a challenging opportunity for growth with competitive salary and benefits packages.

SCIENTIFIC PROGRAMMER ANALYST

Will work with a diverse group developing/supporting computer based project in a major chemical research and development laboratory. Require BS/MS computer science degree with a broad based computer science background. Four plus years experience with IBM OS/MVS/TSO, ASSEMBLER, FORTRAN. Experience/interest in mini/micro-computer based applications.

Please send resumes, including salary history to:

Barbara T. Germaux
Coordinator, Professional Employment
PPG Industries, Inc.
12 North, One PPG Place
Pittsburgh, PA 15272

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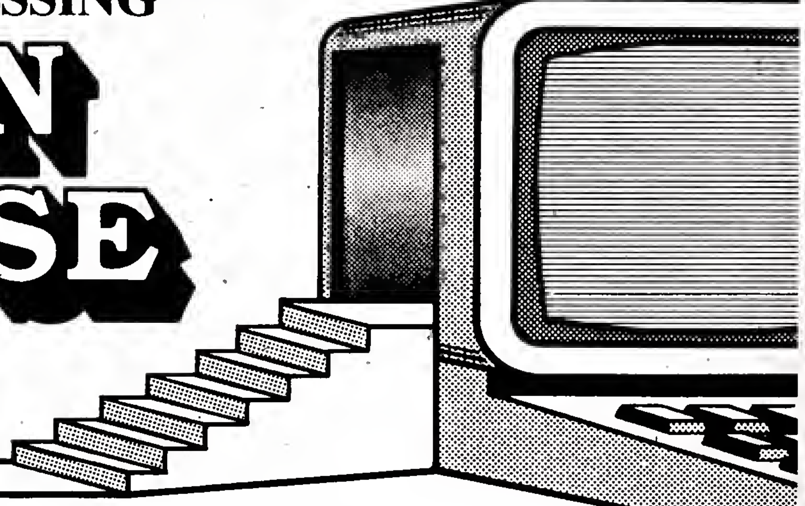
DATA PROCESSING

OPEN HOUSE



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from 10am to 8pm
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166 East Superior Street
Check Hotel Activity Directory for our location.
Parking across the street on Superior.
Refreshments will be served.

The Chicago based national organization for Blue Cross and Blue Shield companies is engaged in a major expansion of its telecommunications network. The network, which serves all affiliate companies nationally, is being significantly enhanced with real-time interactive capabilities that will allow the connection of more than 100 IBM large scale computers.

We are looking for experienced and motivated professionals with Tandem, IBM, Texas Instruments and Burroughs background.

DIRECTOR OF NETWORK PLANNING

5 or more years varied switching network design and implementation management experience, including hardware, software and communications facilities. Tandem and IBM SNA experience. A B.S. in either Computer Science or Electrical Engineering is preferred. An undergraduate degree is required.

MANAGER OF TECHNICAL AND FIELD SERVICES

5 or more years experience in management of technical services, including Burroughs, Tandem, IBM and TI. A B.S. in either Computer Science or Electrical Engineering is preferred. An undergraduate degree is required.

STAFF CONSULTANT, TECHNICAL SERVICES

3-5 years experience in developing and implementing large systems, including substantial programming language knowledge, especially Tandem TAL. College degree or equivalent work experience. IBM internals a plus. Up to 25% travel.

CONSULTANT, FIELD SERVICES

3-5 years experience with large computer networks with an ability to define and resolve customer problems. 10% to 30% travel.

STAFF CONSULTANT, TELECOMMUNICATIONS SOFTWARE

3-5 years experience in designing, developing and implementing large telecommunications systems. College degree or equivalent in work experience. COBOL a must, TI assembler language a plus.

SENIOR CONSULTANT, APPLICATIONS SYSTEMS

5-7 years experience in designing, developing and implementing large applications systems. 1-3 years supervisory skills. College degree or equivalent in work experience.

SENIOR SYSTEMS ANALYST, APPLICATIONS SYSTEMS

5 or more years experience in COBOL programming on IBM or Burroughs systems, 2 or more years of systems design. College degree or equivalent in work experience.

SYSTEMS ANALYST II, APPLICATIONS SYSTEMS

2-3 years complex COBOL programming experience. 1-2 years of detailed systems design. College desirable.

We offer highly competitive salaries; a stable, professional work environment; regular merit appraisals; and a comprehensive benefit package including health care, life insurance, tuition reimbursement and retirement benefits.

Please plan on attending next Tuesday or Wednesday. You'll have the chance to discuss our opportunities and your career with our systems management. If you cannot attend, have any questions, or wish to schedule a private appointment, please call Peggi Sturm at 440-6412, Monday-Friday, 8:30am to 4:30pm.

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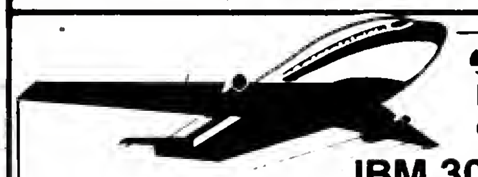

EASTERN

Eastern Airlines has the following programmer openings at its Miami Computer Center:

IBM 30xx SYSTEM SOFTWARE PROGRAMMERS

Requires one year experience with generation, internals, troubleshooting, and/or maintenance of one or more of the following: MVS - JES3 - TCAM - VTAM - NCP - CICS - IMS/DB. These are system programming positions and require assembler language background. (Position JK1)

IBM 30xx INFORMATION CENTER TECHNICAL SUPPORT PROGRAMMERS

Requires experience using one or more of the following software products; MARK IV - TSO - SAS - FORTRAN. These positions assist end users in developing programs and systems. (Position JK2)

UNIVAC 1100 SYSTEM SOFTWARE PROGRAMMERS

Requires one year experience with generation, internals, troubleshooting and/or maintenance of one or more of the following: OS1100 - TIP - DMS1100 - CMS1100 - TELCON. These are system programming positions and require assembler language background. (Position CC1)

IBM CICS APPLICATIONS PROGRAMMERS

Requires an AS or BS degree in Computer Sciences or Management Information Systems plus 2 years experience in Command Level CICS programming using COBOL and SL/1. (Position WL1)

UNIVAC 1100 APPLICATIONS PROGRAMMERS

Requires an AS or BS degree in Computer Sciences or Management Information Systems plus 2 years experience in COBOL programming. (Position WL2)

DATABASE ADMINISTRATION POSITIONS

Requires one year experience supporting databases in CICS-DL/1 or IMS-DB/DC environments. Experience must include use of IMS utilities, database recovery/reorganization and COBOL programming. (Position LR1)

BAL PROGRAMMER

Requires one year of BAL programming experience in an IBM environment. (Position TO1)

PL1 PROGRAMMER

Requires minimum two years PL1 experience in an OS/MVS environment with JCL. (Position TO2)

Working for Eastern Airlines can open up a new world for you. As an employee, you, your spouse, children, and parents can fly anywhere Eastern flies (South America, the Caribbean, the West Coast, etc.) for $6.00 plus tax. With nearly 38,000 employees in our system, we offer tremendous career opportunities. Living in Florida offers a sunfilled casual outdoor year round lifestyle with no state-city income tax.

In applying for any of these positions, please refer to the specific position code letters in parenthesis at the end of each position description. Send detailed resume, including salary history and requirements, to:

EASTERN AIRLINES
Management Recruiting
Department MB
International Airport
Miami, FL 33148

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COMPUTER PROFESSIONALS

Your Place In The Sun: Extraordinary Lifestyle . . . Extraordinary Career

Come to North Carolina-the sunbelt living's great! The natural beauty here enhances our quality of life with beautiful lakes, majestic mountains, and uncrowded beaches-all easily reached from our location in Charlotte. Our climate is conductive to a vast array of recreational activities . . . year-round! And culturally, we are as sophisticated as any major metropolitan area.

As the largest bank holding company in the Southeast, NCNB has a distinguished reputation for creating custom-tailored services to meet the financial needs of our customers, both domestically and internationally. We have the resources and growth to offer you an outstanding career interfacing with top professionals and the very latest advances in data processing technology. Our environment includes: IBM 3081 G, 3081 K, MVS, JES3, TSO, IMS, VTAM.

To keep pace with the dramatic growth of NCNB, the Corporation has committed to a multi-year program to replace our major systems. This process has begun and opportunities are available for **SYSTEMS ANALYSTS** with 3+ years experience designing and implementing systems in a similar environment. Banking experience in one or more of the following is desired: Deposits, Loans, Cash Management, International, Funds Transfer, Item Processing (CPCS). Experience with HOGAN software is a plus.

NCNB and North Carolina-have the best of all possible worlds! Send resume and salary requirements to: Personnel Manager, NCNB Personnel Division, IO7-1, NCNB Corporation, Charlotte, N.C. 28255. We are an equal opportunity employer.

NCNB
Corporation

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SOFTWARE DEVELOPMENT PROJECT MANAGER

Sacramento California company seeking a Contract Project Manager. Must have large systems development experience using IDMS database. Qualified candidates will have a Bachelor's degree and 10 years experience in systems analysis and design. Knowledge of group insurance industry would be a plus. Computer environment is IBM 4341 with VM, DOS/VSE, IDMS, and 60 on-line terminals. Compensation negotiable. Principals only. Send resume and salary history to C.E. Bradbury, V.P., ISD, P.O. Box 254500, Sacramento, CA 95825.

Systems Programmers

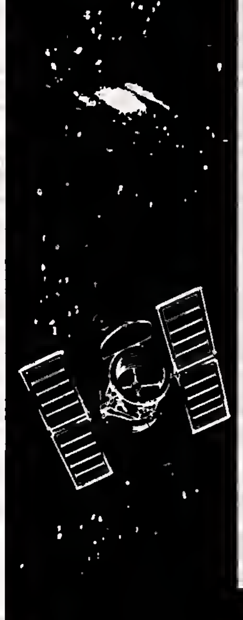
$26,000-$45,000+

Immediate, choice 1984 multiple career opportunities in Upstate NY, NYC & Northeast U.S. Experience with • OS/MVS • IMS • VM/CMS • VAX and other operating systems. Reply in confidence to:

Carol Stuart, DP Specialist
NORMILE PERSONNEL
Box 110 Westview Station
Binghamton, NY 13905
607-723-5377

All fees paid • Nationally affiliated

SPACE TELESCOPE SCIENCE INSTITUTE



SENIOR SOFTWARE ENGINEERS
SENIOR SYSTEMS PROGRAMMER

The Space Telescope Science Institute has several openings for senior and intermediate level computer professionals. We offer an environment that encourages technical excellence and initiative and provides the freedom to solve challenging problems in innovative and creative ways.

A thorough knowledge of software system development techniques as applied to interactive scientific problem solving is essential, as are good communication skills, an active mind, and a commitment to excellence. Substantial direct experience in two or more of the following fields and at least a Bachelor's degree in Computer Science or one of the physical sciences are minimum requirements for these positions.

- Interactive Data Processing
- Real-Time Data Acquisition
- UNIX Operating Systems
- Image/Graphics Processing
- Man-Machine Interface Design
- Networked Operating Systems

ST ScI, located on the Johns Hopkins University campus in Baltimore is a major international center for research in astronomy. The Institute will be the site of scientific data acquisition and analysis for the Space Telescope, which is due to be launched by the Space Shuttle in 1986. We offer an atmosphere of intellectual stimulation and reward, coupled with competitive salary, excellent benefit package, and relocation assistance.

Submit resume, salary history and a portfolio of your work to: Space Telescope Science Institute, Personnel Dept. 8425, Homewood Campus, Baltimore, Maryland 21218.

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SPACE TELESCOPE SCIENCE INSTITUTE
Homewood Campus Baltimore, MD 21218

Data Base Analyst

The Upjohn Company, a leading pharmaceutical company located in Kalamazoo, Michigan, is seeking data processing professionals for data base administration.

Applicants must possess a BS degree plus 2 years experience in COBOL or PL-1 programming and DL/I control blocks and utilities with strong analytical skills. Additional experience with TSO/SPF, IMS/DC, and ADF are highly desirable.

Kalamazoo is a mid-sized southwestern Michigan community offering a mix of cultural/recreational opportunities including lakes, nearby colleges, and a four-season climate. The Upjohn Company offers a competitive salary and benefits and relocation assistance.

For confidential consideration, **please call from outside of Michigan toll free 1-800-253-8600 and ask for extension 3-6767; or call from Michigan collect 616-323-6767 to request a specialized employment application be sent to you immediately.** Please refer to ad number 15673-E when calling.

Upjohn

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An Equal Opportunity Employer M/F

PROGRAMMER/ANALYST

The City of Highland Park, illinois, is accepting applications for a Programmer/ Analyst to assist in implementing municipal computer applications. The position is in the Department of Computer Services and reports to the Director. The hardware environment includes VAX-11 and other minicomputers, local area network, and laser printer. The software environment includes VMS, COBOL, and Oracle database management system. B.S. in computer science or related field is required. Individuals possessing a strong academic record in lieu of experience will be considered. Salary range: $16,611 to $22,340. Interested persons should apply to:

Personnel Office
City of Highland Park
1707 St. Johns Avenue
Highland Park, IL 60035
Phone: (312) 432-0800

We are an affirmative action/equal opportunity employer.

Technical Specialist Systems Programmer

BS in computer science or equivalent experience required. Involves installation and maintenance of IBM, VM, DOS/VSE, Computer Associates and Pansophics software. Consultant to operations and development staff. Excellent opportunity to work independently in the beautiful Pacific Northwest. Salary commensurate with skills and experience. Qualified applicants send resume by January 21, 1984 to:

Personnel
Weyerhaeuser Company
P.O. Box 188
Longview, Washington 98632

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DATA BASE ADMINISTRATOR

Two to four years experience in monitoring data bases for performance, logical and physical design, organization and recovery procedures plus a college degree required. Experience in a CICS, ICCF, DOS/VSE environment preferred. ADABAS and NATURAL experience desired. Electric and water utility experience helpful. Send resume and salary requirements to Personnel Division, Orlando Utilities Commission, P.O. Box 3193, Orlando, FL 32802.

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National Computer Associates is number one in size and in the quality of its personnel consultants. We are the nation's largest network of independently owned firms specializing in the placement of computer professionals. When you come to us you'll have the assurance of knowing that you've made the best possible choice.

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BOSTON: Robert Kleven and Co., Inc
North Brook Park, Suite One, 181 Bedford Street
Lexington, Massachusetts 02173 (617) 861-1020
CHICAGO: Thos. Hirtz & Associates
150 N. Wacker Drive, Suite 1700
Chicago, Illinois 60606 (312) 977-1555
COLUMBUS: Michael Thomas, Inc
65 E. Wilson Bridge Road, Suite 201
Worthington, Ohio 43085 (614) 846-0926
DALLAS: DataPro Personnel Consultants
12720 Hillcrest, Suite 520
Dallas, Texas 75230 (214) 661-8600
DETROIT: Electronic Systems Personnel, Inc
3000 Town Center, Suite 2580
Southfield, Michigan 48075 (313) 353-5580
FLORIDA: Data Sciences Personnel, Inc.
P.O. Box 8577
Hollywood, Florida 33084 (305) 434-6112
HARTFORD: Compass, Inc
900 Asylum Avenue
Hartford, Connecticut 06105 (203) 549-4240
HOUSTON: Career Consultants, Inc.
2000 South Post Oak
Houston, Texas 77056 (713) 626-4100
INDIANAPOLIS: Computer Personnel Services, Inc
107 N. Pennsylvania
Indianapolis, Indiana 46204 (317) 634-4712
KANSAS CITY: D. P. Career Associates
6405 Metcalf, Suite 502
Shawnee Mission, Kansas 66202 (913) 236-8288

Call the NCA firm nearest to you for Salary Survey and Relocation Information.

LOS ANGELES: Superior Resources, Inc.
Personnel Service
17141 Ventura Boulevard, Suite 200
Encino, California 91316 (213) 986-4400
MILWAUKEE: EDP Consultants, Inc
7332 West State Street, Suite 3
Milwaukee, Wisconsin 53213 (414) 475-0077
MINNEAPOLIS: Electronic Systems Personnel
858 Twin City Federal Tower, 121 S. 8th St.
Minneapolis, Minnesota 55402 (612) 338-6714
NEW JERSEY: Systems Search
90 Millburn Avenue
Millburn, New Jersey 07041 (201) 761-4400
NEW YORK: Botal Associates, Inc.
7 Dey Street, Suite 410
New York, New York 10007 (212) 227-7370
NEW YORK UPSTATE:
CFA Associates Personnel, Inc.
2530 James Street
Syracuse, New York 13206 (315) 463-5225
NORTH CAROLINA: DataMasters,
Div. of TaskForce, Inc., P.O. Box 6888
Greensboro, North Carolina 27405
(919) 373-1461
PHILADELPHIA: Systems Personnel, Inc.
115 West State Street
Media, Pennsylvania 19063 (215) 565-8880
PHOENIX: Professional Career Consultants
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Phoenix, Arizona 85016 (602) 274-6666
SAN FRANCISCO: The Computer Resources Group, Inc. Agency, 303 Sacramento Street
San Francisco, California 94111 (415) 398-3535
SEATTLE: Houser, Martin, Morris & Associates
1940 116th Avenue N.E.
Bellevue, Washington 98004 (206) 453-2700
WASHINGTON D.C.: ESP Systems Corporation
914 Lamberton Drive
Silver Spring, Maryland 20902 (301) 649-6171

National Computer Associates

PROJECT LEADER

Beaird-Poulan/Weed Easter Division of Emerson Electronic Company is expanding its MIS Department and offers growth opportunities for a Manufacturing Systems Project Leader.

Our present computer environment includes an IBM 4341 and an IBM 3031 running OS/MVS and DOS/VSE. We use CICS and IMS for data communications and data base.

Our manufacturing systems are being developed in conjunction with the IBM COPICS system.

The ideal candidate for the Manufacturing Project Leader should have 4-6 years in-depth manufacturing systems experience, be degreed and experienced at the detail level with COPICS. OS/MVS experience is a definite plus.

This position offers a competitive salary and benefits package and is located in our Division headquarters in Shreveport, Louisiana. Shreveport is located in Northwest Louisiana, and has a community of 375,000.

Send resumé and salary history to:

BEAIRD-POULAN/WEED EATER
DIVISION EMERSON ELECTRIC CO.
Manager of Employment
P.O. Box 9329 • Shreveport, La. 71139

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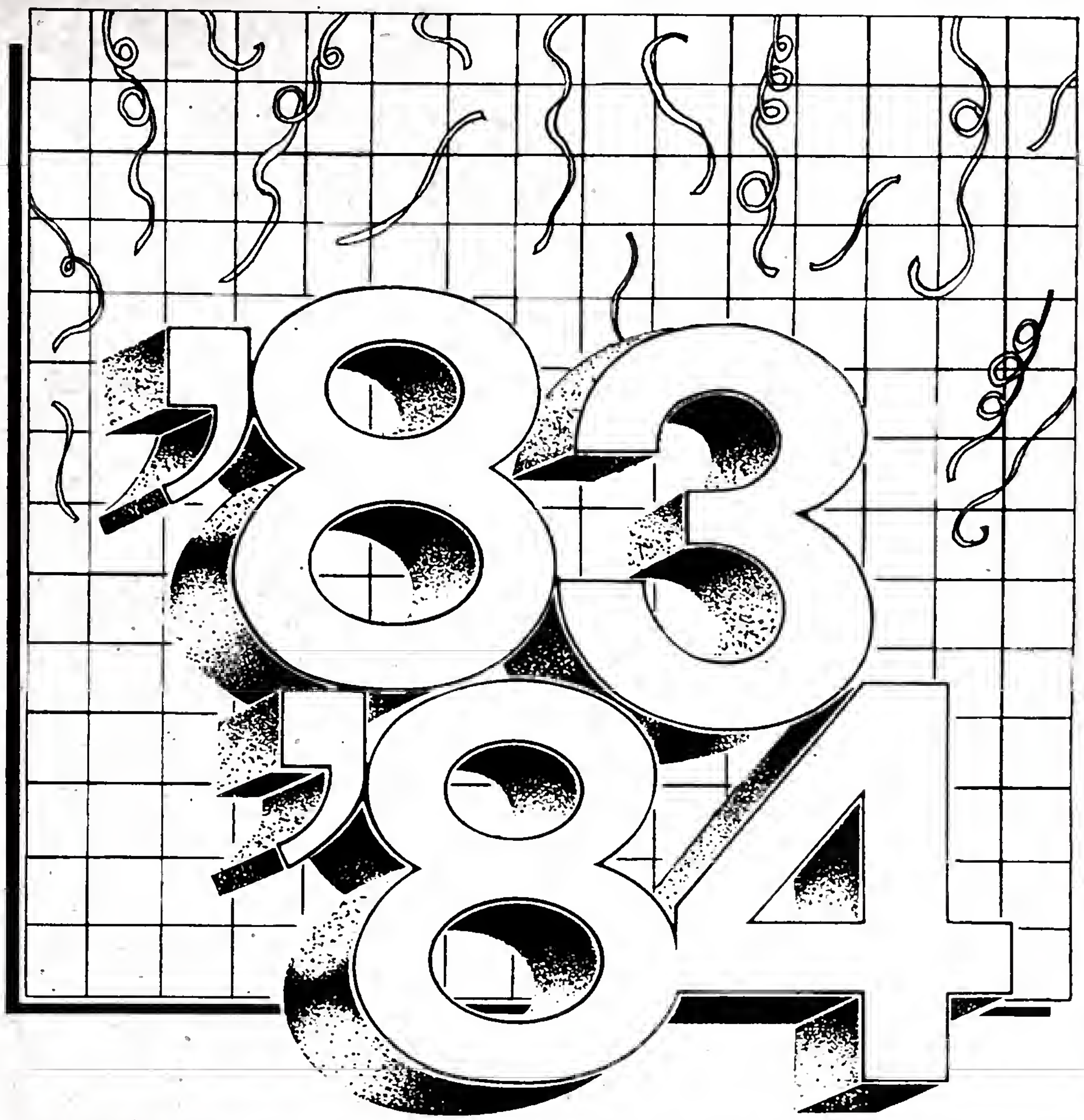

HAVE A HAPPY NEW YEAR AT NORTHROP.

1983 was a year filled with accomplishments at Northrop Data Processing. We completed a major reorganization along divisional lines to enhance our responsiveness to a wide variety of needs. New Data Centers utilizing IBM's latest mainframes and operating systems were established. We introduced our first Information Service Center at the Aircraft Division and provided continued support to Engineering, Manufacturing and Financial functions.

1983 was a big year. As a service organization we can't rest on the success of last year. We must continue evaluating future needs and plan accordingly.

1984 promises to be a year of continued growth for both the divisions we service and ourselves. We will continue applications programming support to a full range of functional organizations and take on new challenges. In 1984, we will create additional Information Service Centers and establish the Applications Development Center as an aid to programmers. Continuing improvements to our network systems will include integration of personal computers into the framework of software services.

1984 looks like another big year for Northrop's data processing professionals. How does it look for you? If you don't see diversified challenge, success and reward coming with the new year, perhaps you should consider our broad range of opportunities.

- **Software Project/Product Management**
- **Computer Systems Planning**
- **Operating Systems Software Support including Performance Tuning**
- **IMS Systems Software & Data Base Administration**
- **Graphics & Aeroscience Support Programming**
- **Manufacturing & Financial Applications Programming**

If you're experienced in any of these areas, we'll welcome your inquiry. For immediate and confidential consideration, send us your resume and, Happy New Year!

Mr. Cris Cristina
Engineering & Administrative Staffing
Dept. 1222/80 NA-CW 128305
P.O. Box 2116
Hawthorne, CA 90250

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Programming

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INTERACTIVE PRODUCTS

Walker Interactive Products' high tech solution for financial applications software has placed us at the TOP of our industry. We offer excellent opportunities for rapid advancement in a state-of-the-art technology. We are looking for dedicated professionals with the following backgrounds:

INSTALLATIONS SPECIALISTS
New York/Chicago/Atlanta/San Francisco

- Three or more years' system programming experience in multiple operating systems, teleprocessing, and database environments such as VM/CMS, IMS DB/DC, IDMS DB/DC, ADABAS, COM-PLETE, CICS and DL 1.
- The ideal candidates will also be familiar with IBM mainframe environments.
- We are seeking sharp individuals who also enjoy trouble-shooting and possess excellent interpersonal skills.
- These are positions involving customer contact and requiring 75% travel.

SENIOR QUALITY CONTROL ANALYST

- You will need a degree in CS.
- Previous experience in financial application systems is required.
- You must have exposure to DBMS and TP Monitors IBM 370.
- Experience with structured COBOL is necessary.
- And strong communication skills are a must.

SENIOR PROGRAMMER ANALYST
IBM Mainframe Environment

- You must have 4 or more years experience in COBOL programming.
- A familiarity with accounts receivable, accounts payable and/or general ledger is required, as is an enjoyment of maintenance and/or development.
- Project analysis experience is helpful.
- Assembler not necessary, but helpful.

SENIOR PRODUCT ANALYST

- You will need a BS/BA or equivalent.
- You should have 5 or more years COBOL/Assembler programming experience in an IBM mainframe environment.
- Experience in multiple operating systems, data base and teleprocessing systems is required.
- You should be an innovative fast learner with excellent communications skills.
- This is a position involving 10% travel.

In addition to high growth potential in a progressive environment we offer an excellent salary and benefits package. Please send your resume to the Director of Human Resources, Walker Interactive Products, 100 Mission Street, Suite 300, San Francisco, CA 94105.

An Equal Opportunity Employer

Senior Capacity Planner
San Francisco Location

Bank of America, one of the world's leading financial services organizations, currently has an opening for a Senior Capacity Planner.

In this position, you will be responsible for capacity planning for all large-scale equipment (CPU's, Tape, DASD, Printers) in the teleprocessing environments for two large California Data Centers. You will assess IMS application plans and monitor IMS system activity. In addition, you will develop enhancements to the IMS Capacity Planning Methodology.

You should have a minimum of 10 years' Data Processing experience, preferably systems programming background in a heavy IMS environment with an emphasis on IMS performance/capacity planning. Strong communication and interpersonal skills are required.

Bank of America offers an outstanding salary and benefits package designed to attract and maintain top professionals. Send your resume to: Bank of America, Professional Recruitment, Dept. 3442-0109A, P.O. Box 37000, San Francisco, CA 94137. An equal opportunity employer m/f/h/v.

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Four year, church related, accredited, liberal arts college with 1,200 students, seeks two faculty members to teach in a growing computer science program beginning September 1, 1984. Duties will include teaching, advising and committee assignments. Preference will be given to candidates with Ph.D. in computer science but will consider persons with a Master's degree. Experience or education in management and/or business administration is a plus. These are permanent faculty positions. Aurora College currently has 300 computer science majors. The program is supported by an on-campus VAX 11/780 computer with VMS operating system. Send vitae, transcripts and three references to Dr. AJ Anglin, Vice President for Academic Affairs, Aurora College, Aurora, Il. 60506. Application deadline is February 24, 1984. *An Equal Opportunity/Affirmative Action Employer.*

SYSTEMS MANAGER

A medium sized property and casualty insurance company with home office located in the mid-Atlantic region is seeking an experienced manager to run the data processing department. Must have prior experience in PMS systems with strong analytical and communications skills. Competitive salary and benefits. Send resume and salary history in confidence to:

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Computerworld
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Framingham, MA 01701

ELECTRICAL ENGINEER. Disk drive read/write engineer responsible for design and development of Winchester technology mass storage disk drive products. Bachelor's degree in Electrical Engineering required. Must demonstrate familiarity with Winchester disk drive technology. $24,600.00 per year; 40 hour week. Contact or send resume to Colorado Job Service Center, 344 Main Street, Longmont, CO 80501. Order No. 2488541.

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Motorola's Government Electronics Group has immediate career opportunities for candidates seeking a stable working environment. We are searching for highly seasoned, top of the line individuals who can contribute to our team efforts in fourth generation languages and structured design methodologies.

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We have immediate needs for Systems Development Project Managers with a proven track record of planning, organizing, and implementing projects. Candidates must have formal experience in project management using a development methodology, good user communications skills and experience in either quality assurance, marketing or MRP. Degree preferred with several years of successful project, management experience.

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We need Business Systems Analysts with good user communications skills and experience in Quality Assurance, Logistics, Marketing, MRP, and/or expert knowledge of Financial Applications. Must be able to identify business problems, recommend solutions, and have proven skills with formal structured analysis methodologies. Degree preferred wtih several years experience required.

Qualified applicants please forward your resume and salary history to Jerry Rule at:

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Government Electronics Group

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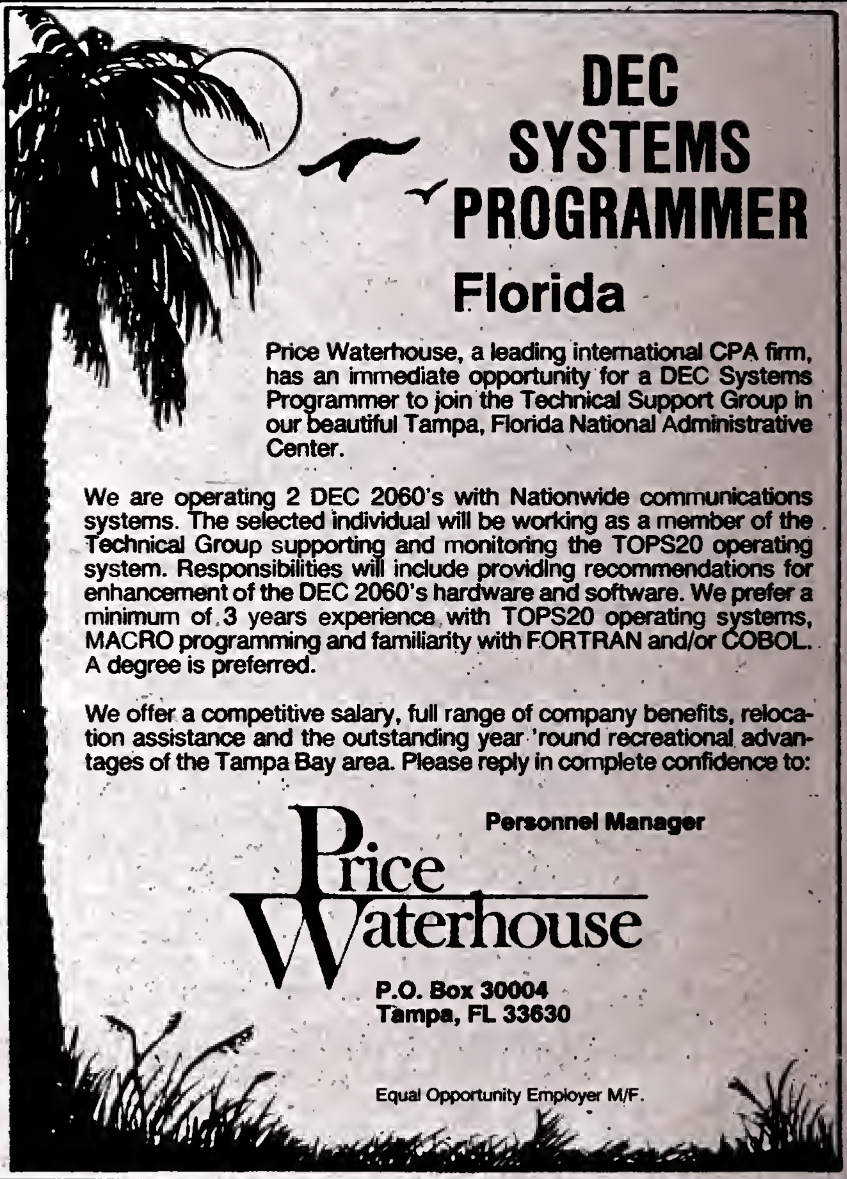

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Price Waterhouse, a leading international CPA firm, has an immediate opportunity for a DEC Systems Programmer to join the Technical Support Group in our beautiful Tampa, Florida National Administrative Center.

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We offer a competitive salary, full range of company benefits, relocation assistance and the outstanding year 'round recreational advantages of the Tampa Bay area. Please reply in complete confidence to:

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The corporate offices of the J.A. Jones Construction Company will be acquiring an IBM 4381 system this year, requiring an ambitious Systems Programmer to help plan, install and maintain systems software.

To qualify for this opportunity you should have at least 3-5 years systems programming experience including 2 or more in an MVS environment. You must have in-depth knowledge of MVS/SP, TSO/ISPF, JES2 and VSAM, as well as effective communication skills. Working knowledge of assembler, CICS and ACF/VTAM would be a plus.

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J.A. Jones is an internationally successful company involved in all aspects of the construction industry. We will provide you with a competitive salary and a full benefits plan, including specialized attention to your relocation concerns. Send your resume including salary history and requirements for immediate and confidential consideration: Employment Supervisor, Dept. #0184, J.A. JONES CONSTRUCTION COMPANY, 6060 St. Albans Street, Charlotte, NC 28287. An Equal Opportunity Employer M/F/H. No Agencies Please.

J.A. JONES
CONSTRUCTION
COMPANY

ASSOCIATE DIRECTOR COMPUTING SERVICES

The University of Nebraska Medical Center is seeking a strong managerial individual to help lead the Computing Services Department in networking IBM mainframes, a DG super mini and several other mini and micro computers for a total integrated system. Individual will also be involved in planning future growth, preparing budgets; establishing and maintaining internal policies and procedures in a growing department providing on-line Hospital Administrative and Academic Computing Support. Candidates should have a minimum of 10 years experience with demonstrated increasing managerial responsibility. 3 years experience should be in managing a computer environment with multi-department information systems. A bachelor's degree in computer science or related area required. MS degree and experience in a health care setting is preferred. Submit resume and salary history to:

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Omaha, Neb. 68105

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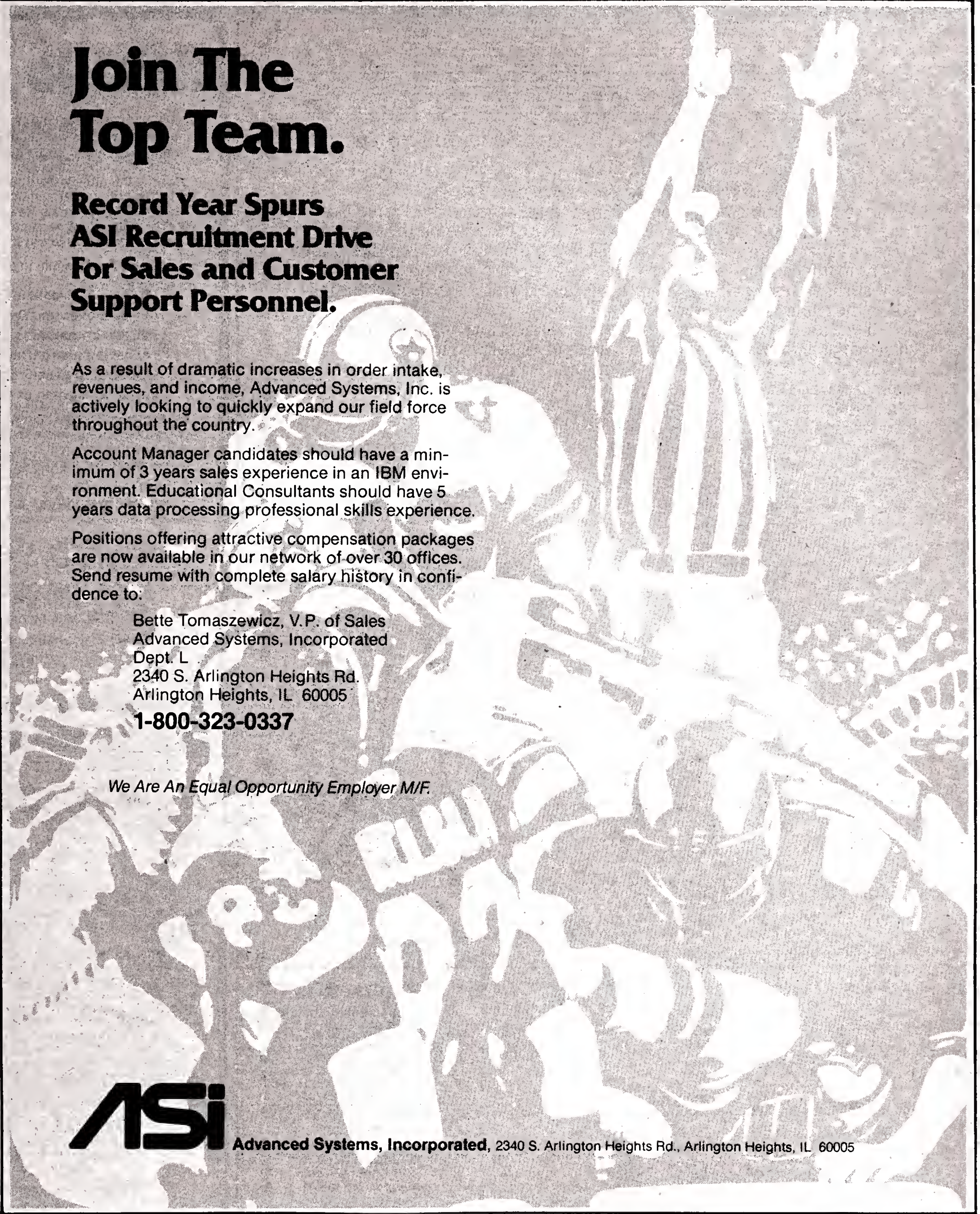
451-4220



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All fees, interview and relocation costs paid by our client company. Send confidential letter or resume to Sheehy Associates, Inc., Suite M., 465 Congress St., Portland, Maine 04101. Or call (207) 761-1929 collect.

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A major Wichita, Kansas manufacturing corporation has an immediate opening which will play an important role in the expansion and continued development of their Data Processing division.

The position requires a minimum of 3 years large IBM systems programming experience. Successful applicant will have current working experience in MVS/SP, JES2, VSAM and OS/JCL. This person will be key in an upcoming conversion to MVS.

Starting salary based on pertinent experience to include excellent benefits program and relocation assistance.

Qualified applicants, please send resume to:

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530 S. Market, Suite 216
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Or call, 316/269-2042, from 8:00 AM to 6:00 PM, or 316/721-3531 after 7:00 PM and on weekends.

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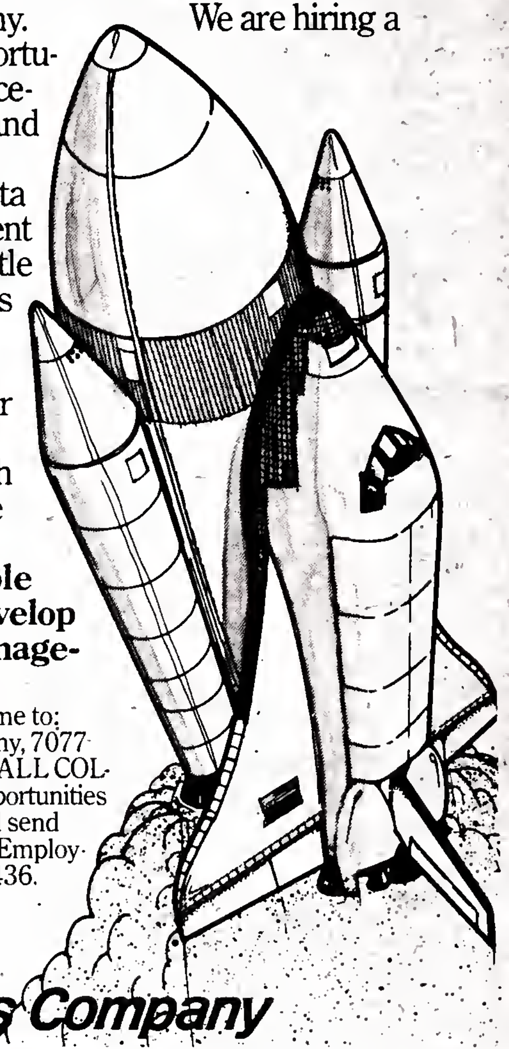
With Current Experience In Applications Software, OS/SW, Communications Networks, Compilers, DBMS and Development Tools.

We are now assuming our responsibilities as the Shuttle Processing Contractor for NASA at the Kennedy Space Center, Florida and the U.S. Air Force at Vandenburg Air Force Base, California. This six year contract (with options to fifteen years) will provide you with a secure opportunity to join the team of professionals like yourself who are making a significant contribution in the manned space program.

If you are an experienced computer professional whose goal is more challenging and rewarding work in a state-of-the-art environment, look to Lockheed Space Operations Company. We are hiring a number of professionals, like you, to fill opportunities involving the development and enhancement of: Applications Software (Real-time and Interactive), Operating Systems Software, Communications Networks, Compilers, Data Base Management Systems and Development Tools. You will be working on the Space Shuttle Launch Processing Systems (LPS), which is a highly distributed network of over 300 MODCOMP Super Mini Computers and a large number of Honeywell 6000's with over 3.5 billion bytes of mass storage. Some of these opportunities will involve a three month program to become familiar with the entire LPS and the space system unique OS/SW.

We also have opportunities available for MIS Applications professionals to develop a wide variety of on line Data Base Management Systems.

For immediate consideration call or send your resume to: **Donald C. Quirk,** Lockheed Space Operations Company, 7077 North Atlantic Avenue, Cape Canaveral, Florida, 32920. CALL COLLECT (305) 799-0100. Candidates who wish to pursue opportunities located at Vandenburg Air Force Base, California should send their resume to: Lockheed Space Operations Company, Employment Office, 1100 West Laure Avenue, Lompoc, CA, 93436.



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St. Petersburg, Florida
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A key start-up role

General Electric offers a ground-floor opportunity managing the installation, implementation, and administration and maintenance of a Johnson Controls Security System for a plant security operation utilizing PDP 11 computer.

Credentials

A technical degree, in-depth experience with DEC PDP 11, supported by strong managerial capability. Must be U.S. citizen.

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Attractive Florida location...with lower cost of living advantages ...strong career prospects within the growing GE organization. Salary is commensurate with responsibilities; excellent benefits.

Contact

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Immediate opening. Responsible for direction, coordination, planning of M.I.S. activities. Must have a minimum of 3-5 years experience in hospital systems analysis, RPG programming and operation in IBM System 34-36 environment. Currently beginning installation of IBM H.P.M.S. software. Must have excellent interpersonal skills for coordinating an innovative information system. Please submit resume to:

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St. Joseph Hospital
297 Center Street
Bangor, ME 04401

NCR IMOS Programmer

Established software house has openings for Programmers with Accounting or Business applications background. NEAT/3 exposure would be helpful. Salary open based upon experience. Send resume in confidence to **Datamerica Corporation, P.O. Box 469, Fort Scott, KS 66701,** Telephone **(316) 223-5340**

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Candidates for consulting positions should have:

- **2 years of RAMIS II/FOCUS experience**
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- **excellent interpersonal skills**
- **leadership experience or potential**
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For those real pros who meet our high standards, we offer comprehensive benefits, outstanding salaries, liberal expense policies, and bonuses that directly reflect one's contribution to company growth.

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Clinton Professional Center
65 Old Highway 22, Clinton, New Jersey 08809
(201) 735-6300

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Teledyne Continental Motors, a top division of a Fortune "200" corporation and a proven leader in the general aviation industry, has an opportunity available for Data Processing professionals. These positions are located at our sunny Mobile, AL headquarters, near the Gulf of Mexico.

To qualify, you should have a degree in Computer Science or related field and a minimum total of 2 years experience in business applications, preferably in a manufacturing environment. Your background should include heavy COBOL programming and Database experience. Our operating environment includes an IBM 4331 computer using DOS/VSE with on-line Programming under CICS.

We offer a competitive salary and comprehensive benefit program including dental and vision care. We're conveniently located near beautiful recreational areas and pleasant residential communities. For immediate confidential consideration, write or send resume including salary history to:

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COMPUTER ELITE

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If you have at least 5 years experience with business computer systems and are clearly superior in talent, then we are interested in you.

We are a small, high technology/advanced software company with national and international reputations as the leader in developing complex, online, integrated business computer systems using state-of-the-art fourth generation language technology. We are currently undergoing explosive, exciting growth and are looking for top-quality personnel to participate in this growth.

We require a demonstrated ability to perform, rapid learning ability, intelligence, creativity, tenacity and industry in order for you to acquire new leading edge computer systems skills. 10% travel desirable, but not mandatory. We have openings for:

SENIOR PROGRAMMER/ANALYSTS

- Minimum 5 years business computer system development experience.
- DBMS, FOCUS, RAMIS, NOMAD or COBOL are plusses

Please send your resume to:

FOURTH GENERATION
TECHNOLOGY, INC.

4GT

Nigel S. Read, President
444 Camino Del Rio South, #124
San Diego, California 92108 EOE
Telephone: (619) 294-9058

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Our RAPID EXPANSION is creating immediate opportunities for degreed individuals with experience in the following areas:

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Programmer/Analysts (2+ years exper.)

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THE ORKAND CORPORATION is a well-established management consulting firm with a proven track record for providing high-quality research, management, and consulting services to our clients. Our current and projected growth will create continued opportunities for career advancement. We would like the chance to review your experience and career goals in light of our staffing requirements. Please forward resume to Personnel Department CW (refer to specific position), 8630 Fenton Street, Suite 938, Silver Spring, Maryland 20910. Your credentials will be reviewed in confidence. Principals Only.

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Auxton Computer Enterprises, Inc., a leader in providing management and data processing consulting services to the telecommunications industry, is currently seeking additions to its management team to help keep pace with rapid growth and expansion. Individuals hired will be afforded the unusual opportunity to apply their skills to a wide variety of internal and external assignments while learning AUXCO's products, services and operations, in preparation for positions of greater responsibility and contribution in the future.

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- Large systems development experience
- Sound business acumen

These positions will be based at AUXCO's corporate headquarters in beautiful Orlando, Florida. Some travel will be required. For confidential consideration, please submit resume including salary requirements, to: K.N. DANE

AUXCO Auxton Computer Enterprises, Inc.

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Our large scale product development effort means opportunities for Systems & Software Engineering Professionals. If your background fits any of the openings below, see us at the UniForum Winter Conference. There our technical managers and engineers will be showing off our systems and talking about careers. Your visit could begin a bright new future.

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Design and implement "C" language software products for our Motorola M68000/UNIX systems and intellegent clustered workstations. Applications range from distributed transaction processing to office automation.

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Specification, design and implementation of UNIX software kernel enhancements and modifications. Operating system performance analysis and evaluation.

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Design and develop software related to device emulation projects (SNA, SDLC, X.25, Bisync) and local area networking.

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QA engineering for real-time multi-user UNIX software applications written in "C", including network test, SNA,X.25, SDLC, Bisync. Also "C" and UNIX software programmers for productivity and test tool development.

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See us at Booth 12 (on the Terrace level) or stop by our Hospitality Suite between 4PM & 9PM at the Washington Hilton.

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Office of the Vice Provost
Computing and Information Services
Lehigh University
Linderman Library 30
Bethlehem, PA 18015

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MANAGER OF ADMINISTRATIVE SYSTEMS

We are seeking an individual to manage the Administrative Systems of our Computing Center. Reporting to the Director of the Computing Center, this individual will have responsibility for administrative programming, development and support; supervising administrative programmers; generating documentation; setting priorities for maintenance, development and recommendations regarding new software or use of consultants. The successful candidate will have a BA or BS, 3-5 years of experience in progressively responsible positions. Familiarity with PRIME Information Systems and the AIMS software package desired or experience in a PICK operating system environment. Prior work in an academic setting highly desirable. Good communications skills a must.

We offer competitive compensation and excellent benefit package. Pleasant, professional work enviroment in an expanding, growing computing center. Send resume and salary history in confidence to Ms. Lee Robinson, Personnel Department, Swarthmore College, Swarthmore, PA 19081.

EOE M/F/H

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Middle South Services has one of the South's largest data processing centers serving one of the nation's largest power systems. Middle South Utilities, our parent company, is a major electric utility. Our hardware environment includes two IBM 3081s, and IBM 4341 and Tandem mini 16s. If you are a career-minded EDP professional, we have the following opportunities available:

PROJECT LEADER With strong hands-on management background to work on an on-line distribution, construction and operating system. Requires at least 1-plus years experience as a first-line supervisor or lead analyst on a medium to large-scale system utilizing IMS DB/DC and involving maintenance, enhancement and program performance.

(IMS) SYSTEMS PROGRAMMER Will install new releases, apply maintenance, perform problem resolution and assist with tuning. Requires at least 1-2 years systems programming experience in IMS DB/DC and related products.

(MVS) SYSTEMS PROGRAMMER With at least 2-plus years experience in MVS operating systems to install, monitor, help problem-solve, tune and assist in the installation of MVS/XA systems migration.

ANALYST PROGRAMMERS Requires previous experience in scientific applications with a sound knowledge of PL-1 and OS JCL. Though not required, knowledge of IMS/ADF or FORTRAN would be a plus. Computer applications development with exposure to a VM operating system would be helpful.

SENIOR ANALYST PROGRAMMERS The ideal candidates will use their extensive experience in designing and programming business systems on a large mainframe to develop and enhance financial systems. Application experience preferred in cost accounting, inventory control, general ledger and/or accounts receivable. Familiarity with COBOL, PL-1 and TSO helpful but not required. An accounting degree, computer science/business degree or equivalent work experience is required.

Due to our size and scope of operation, we offer access for advancement, career stability and an excellent salary with major benefits. For more information, call our number below or to apply directly, send your confidential resume to **Byron Heath or Richard Jackson, MIDDLE SOUTH SERVICES, INC., P.O. BOX 61000, NEW ORLEANS, LA 70161.**

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Frank E. Basil, Inc., an international Operations and Management company, has successfully completed contracts worldwide both as prime contractor and subcontractor.

Currently, we anticipate the award of the continuation of the Saudi Naval Expansion Program (SNEP), an effort which will require mobilization in early 1984. To meet the demands of this project, we have immediate positions available for the following skilled computer professionals:

- **ADP Department Head**
- **DP Manager**
- **Data Base Administrator**
- **Systems Software Programmer**
- **Applications Programming Supervisor**
- **Applications Systems Analyst**
- **Systems Analyst**
- **Programmer Analyst**
- **Applications Programming Supervisor**
- **ADP Planning/Staff Services Branch Head**
- **ADP Documentation Specialist**

To qualify for one of these positions, your skills should include some of the following utilizing IBM 360/370, 3033, 3081:

TSO/SPF
ACF/NTAM
ACF/NCP
RACF
MVS
JCL
VTAM
ADF
SCL
OS COBOL
IMS DB/DC
"C" List

Most of these positions, which will be based in Saudi Arabia, are single status. All require U.S. citizenship.

If you're a computer professional looking for a challenging position overseas, here's your opportunity to display your talents. Send your resume in complete confidence to: Dept. 109, Frank E. Basil, Inc., 1054 31st Street, N.W., Washington, D.C. 20007. An equal opportunity employer.

BASIL

SOFTWARE ENGINEERS

Our client's sales have almost doubled in the last five years. Due to this tremendous growth we have been asked to locate for them software engineering professionals for Raleigh, North Carolina.

If you have a BS/MS CS, BS/MS EE or equivalent technical degree with three plus years experience in design and implementation of software modules for Motorola 68000 or Intel 8086/8088 based products. Or if you have experience in the design and implementation of digital circuit boards for Motorola 68000 or Intel 8086/8088 based products we would like to talk to you.

For immediate consideration call or write to

f-o-r-t-u-n-e

Personnel Consultants of
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138 Mine Lake Court
Raleigh, North Carolina 27609
(919) 848-9929

Company Paid Fee

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Computer Professionals

We Have A Job For You As A

SYSTEMS ANALYST

Exciting plans in data processing require us to recruit new talent that is self-motivated, innovative and technically competent for participation in major new project development. Individual would be responsible for work flow analysis, feasibility study, preparation of system specifications and implementation activities. Two new projects that require this recruitment effort are our major new credit scoring/risk monitoring system for the Credit Card and Consumer Loan Divisions as well as a study to improve Branch processes through advanced technologies.

Candidates must have three years strong prior financial systems analysis experience and a minimum of five years programming or related technical data processing knowledge with heavy user contact. Will possess excellent presentation skills, strong writing skills and the ability to work independently and with users at all levels.

Competitive benefits and starting salary. Qualified applicants forward your resume to: D. Gregg Paul, BANK OF VIRGINIA, Operations Center, P.O. Box 25970, Richmond, VA 23260, or telephone (804) 747-2829. An equal opportunity employer m/f/h.

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Southeast Location

Our company's outstanding growth in a manufacturing field has created an excellent career advancement opportunity for a Systems Programmer. This position includes responsibilities for installation, modification, and tuning of systems software, including: MVS, VTAM, JES, ROSCOE and TSO.

Qualified candidates should possess 3-5 years experience in systems programming, including exposure to IMS DB/DC systems, communications techniques and job entry subsystems.

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The National Academy of Sciences, a prestigious Washington D.C. based institution has a career opportunity within a progressive environment which includes a modern DBMS and state-of-the-art application development tools.

This key position will be responsible for the planning, design, development, maintenance and user interface for the MSA payroll/personnel systems. The ideal candidate will possess a thorough grounding in programming and analysis with at least one year of experience with the MSA payroll/personnel system. Excellent opportunity for advancement.

We offer an excellent starting salary based upon qualifications plus a liberal benefits package (includes paid relocation) and a desirable working environment. We are conveniently located in scenic Downtown Washington near the White House and public transportation. Interested applicants should send resume and/or letter in confidence to Personnel Office, or call Richard Lawrence at: (202) 334-3400.

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PROGRAMMER

SENIOR PROGRAMMER/ ANALYST

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Programming

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Lockheed-Ontario has challenging career opportunities in the development and support of business and financial applications.

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Responsibilities will include creating system specifications, monitoring the system development process, and providing assistance to users of the system. Your background should include 5+ years' structured COBOL programming and a working knowledge of structured analysis/design and data base concepts. Proficiency in OS/VS JCL, TSO/SPF, PANVALET, VSAM and IBM utilities is required. IMS DB/DC a plus.

Join a leader and put the challenge back into your career. Please send your resume to Lockheed-Ontario, Dept. 1-542-5, P.O. Box 33, Ontario, California 91761. Lockheed is an equal opportunity, affirmative action employer.

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Data Processing

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CANDLE CORPORATION, a multinational computer software company (developer of OMEGAMON®), is looking for extremely qualified people to join our Technical Services staff. Our highly innovative products have attracted an impressive range of Fortune 1000 clients. Continued growth and diversification have created the following openings:

Software Development

To assist in the development of user friendly product externals and participate in overall product design. This position will involve coordination and review among internal technical personnel and the user community to insure design specifications and externals requirements are met.

Requirements include four or more years of software development experience with large scale systems and knowledge of Systems Performance Evaluation Software. Excellent verbal and written skills are necessary.

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You will be the technical interface between Candle and our customers. It is through this group that the image of Candle is reflected to the world.

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Requires extensive knowledge of CICS/VS internals in a DOS/VS(E) environment. Must have excellent communication and presentation skills. Knowledge of performance and tuning concepts is also desired. Position involves extensive customer interface. Openings in our Los Angeles, New York, and San Jose facilities.

SR. SYSTEMS SPECIALIST

Requires knowledge of MVS and either IMS or CICS internals. Must have excellent communication skills. Knowledge of performance and tuning concepts is also desired. Position involves extensive customer interface. Openings in our New York, Los Angeles, and San Jose facilities.

Quality Assurance Manager

Will manage effort to build test cases and stress test all Candle software products prior to shipment. Also responsible for ensuring user friendliness of Candle products, good documentation and ease of installation. Systems programming background as well as quality assurance experience in large scale environments desired.

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Must have a minimum of 3 years' MVS operating system experience and previous experience with design/implementation of data security systems. Position open at our Los Angeles facility.

Product Planning Specialist

You will assist with design review, design coordination and product planning. Other responsibilities include current/future product research and consulting to the Marketing Department.

Requires broad experience in evaluation and planning activities in large scale environments. An in-depth knowledge of MVS, VM, IMS, CICS or IBM TP is also required. Position open at our Los Angeles facility.

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Duties will include internal/external design. Heavy assembler language coding, 3-6 years, and a good working knowledge of MVS/370 control and flow, as well as performance considerations. Knowledge of supervisor helpful.

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Positions are now available in Product Management and Marketing Support. We are looking for those rare individuals who combine a solid understanding of IBM's MVS environment (familiarity with IMS is a definite plus) with outstanding communications and leadership skills.

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Boole & Babbage

Development Project Manager

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You must have a minimum of 11 years of data processing experience, with a minimum of 3 years of management experience preferably in a development environment. Experience in development work on a 32-bit minicomputer, using modern techniques and tools, and experience with UNIX® on a 32-bit minicomputer is required.

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prc

Planning Research Corporation

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You will be responsible for development and support of graphics software including writing software to drive graphics devices. To qualify, your background should include at least two years experience in FORTRAN and Assembler and knowledge of graphics software and hardware. Experience with IBM VM/CMS desired.

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You will participate in the design and development of innovative interactive software for high end microcomputer applications. To qualify, you need at least two years experience in interactive software development with a strong background in FORTRAN, C or Assembler and knowledge of UNIX or IBM PC/DOS operating systems. Experience with database design, human factors, data communications graphics, or statistics desired.

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You will be responsible for support and enhancements to current products and contribute to the development of new products. Your background must include at least two years experience in FORTRAN and Assembler and experience with large scale FORTRAN programs.

We offer a competitive salary and benefits program and relocation assistance. Send resume indicating position of interest to:

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Applications should be received by January 31, 1984.

PERSONNEL ADS---INFORMATION SERVICES DEPARTMENT

The Christian Broadcasting Network, Inc. has immediate openings in their Information Services Department for the following positions:

PRODUCTION CONTROL ANALYST

To support our Help Desk function. 2-4 years extensive MVS, operating experience and a strong working knowledge of IBM O/S JCL and utilities is a must. Must be able to interface well with users. Experience in TSO/SPF and Telecommunications is a plus.

SR. COMPUTER OPERATOR

Requires a minimum of three years hands on experience on a large scale IBM Mainframe console using MVS JES2 or 3. Must be able to work well with people. A good working knowledge of IBM O/S JCL is a plus.

SR. PRODUCTION SUPPORT ANALYST

Requires a superior knowledge of IBM O/S JCL, TSO/SPF, C-lists, and macros. Should have a good working knowledge of one or more of the following: COBOL, PL1, Pro-grammer, or SAS (two years experience or better preferred). Responsibilities will include maintenance of production JCL, Production libraries, development of C-lists, macros and other productivity aids, development and installation of software packages.

If you feel led and wish to serve, send resume in confidence to:

Employment Manager
Christian Broadcasting Network, Inc.
CBN Center
Virginia Beach, VA 23463

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Sr. Director, Info. Syst. Div.

Must be familiar w/hospital projects & systems engg. & extensive knowledge in IBM health care systems to direct & provide well defined & quality computer service for health care industry. Analyze data & plan layout, conduct workshops & provide tech. consultation to corp. executives. BSCS w/4 yrs expr. in job offered; or BS Engg. w/2 yrs in job offered + 5 yrs in systems engg. + 6 mos. extensive CS training. $45,000/yr. Job in LA. Send this ad & your resume to Job #1431, PO Box 865, Sacramento, CA 95804, not later than 1/24/84.

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Numerous positions are now available for large mainframe IBM P/A's. Majority of needs are in new development. These are Blue Chip Twin Cities companies offering excellent starting salaries, excellent growth potential, state-of-the-art environment plus relocation packages. Requires 2+ yrs exp in COBOL, OS/MVS, on-line a plus. Salary Range from $25-35,000.

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to perform software installation, maintenance, and performance tuning in an MVS/JES2 environment. Previous systems experience with large IBM systems is required. Experience with SMP, performance analysis, capacity planning and MVS/JES2 is desirable. The University of Iowa offers the advantages of a major university in a small mid-western city. Screening of candidates will begin 30 January 1984. Send resume with salary history to:

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System Support Manager
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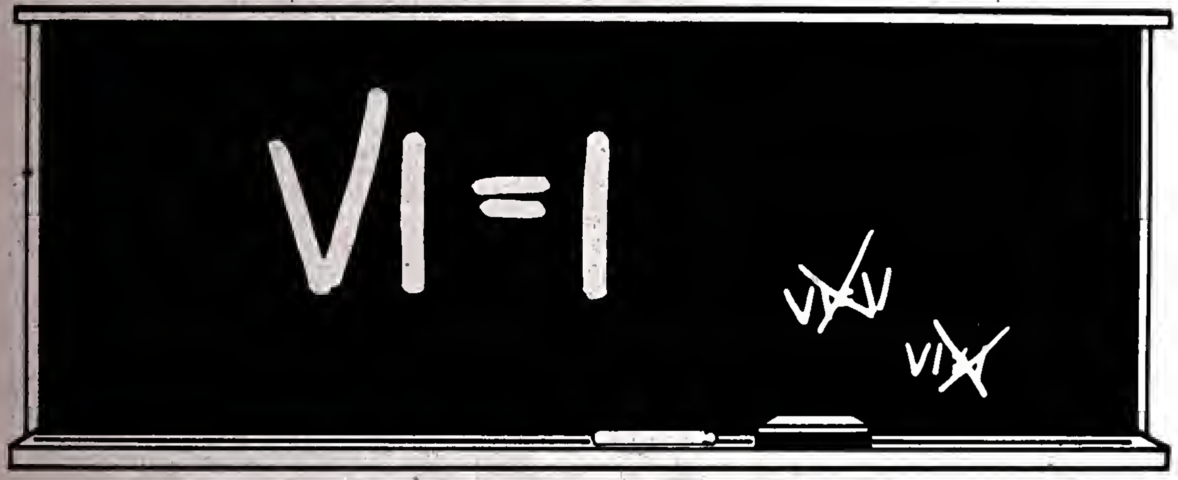

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SPR has immediate openings for Programmer Analysts with at least 3 years experience with any one or combination of the following skills:

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444 Market Street
415/981-6440

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312/346-7001

St. Loius, MO 63101
720 Olive Street
314/231-7400

Naperville, IL 60540
350 W. Shuman Blvd.
312/357-8005

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312/782-1024

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313/963-8470

Chicago, IL 60606
150 S. Wacker Dr., Ste. 775
312/782-6062

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6100 Rockside Woods Blvd.
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Dr. Duane Braaten,
Computer Science Department,
Mankato State University,
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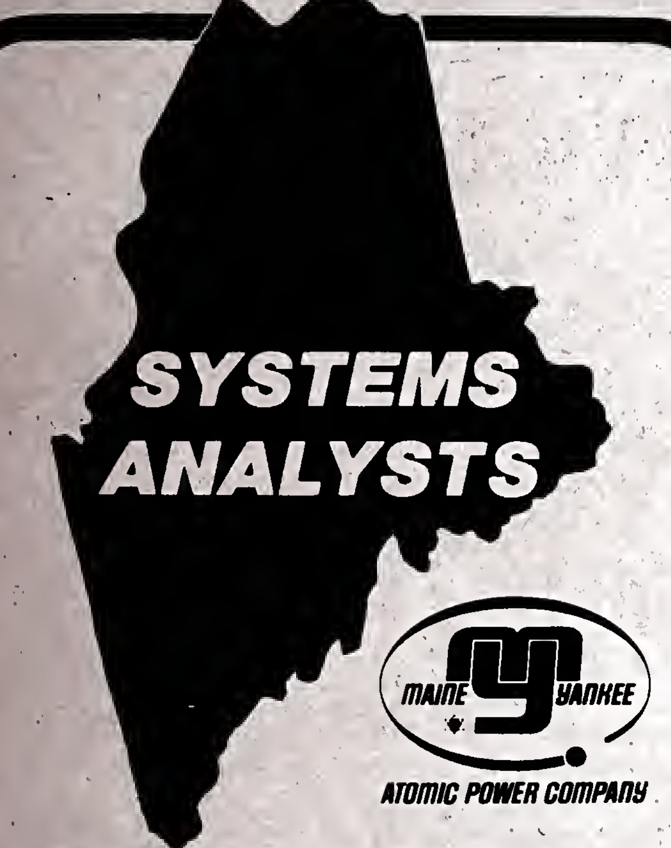

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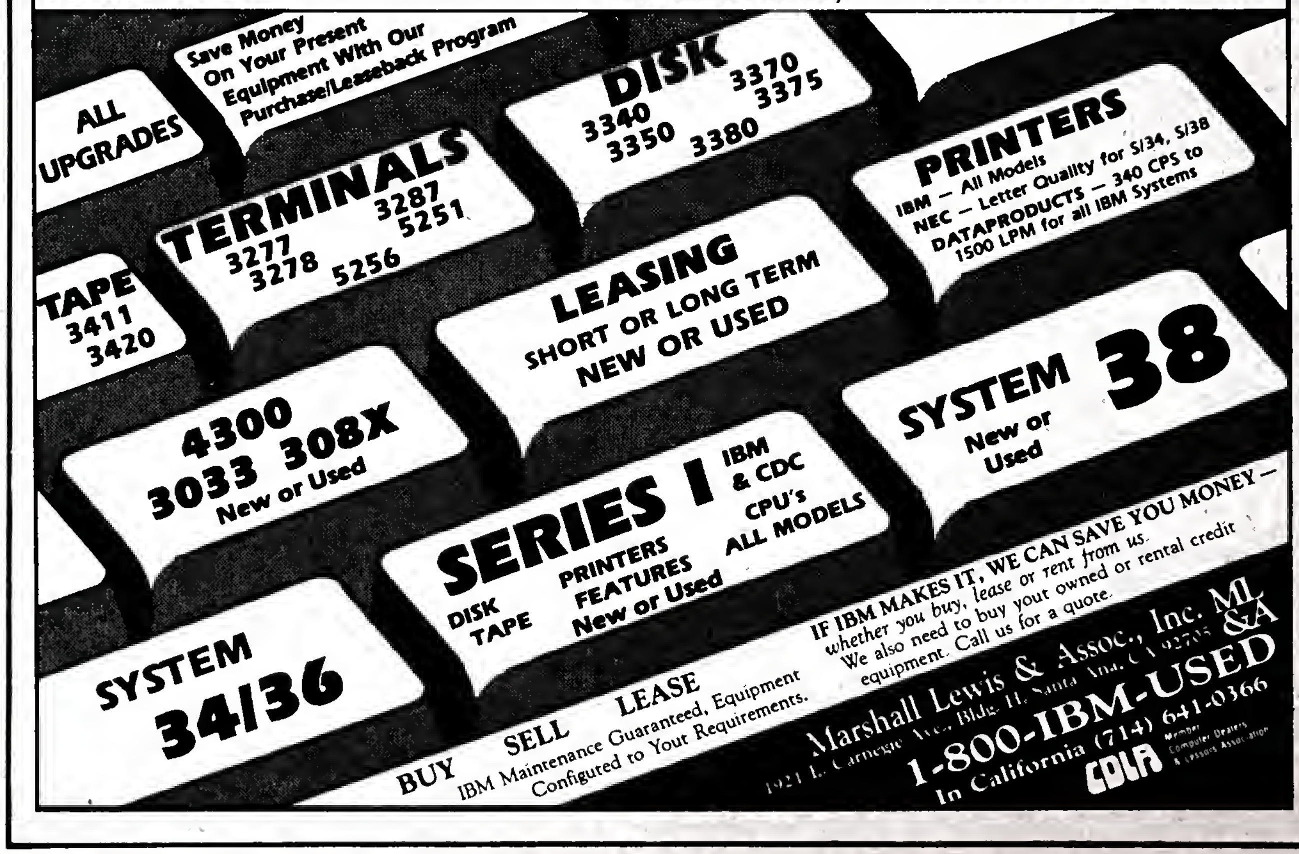

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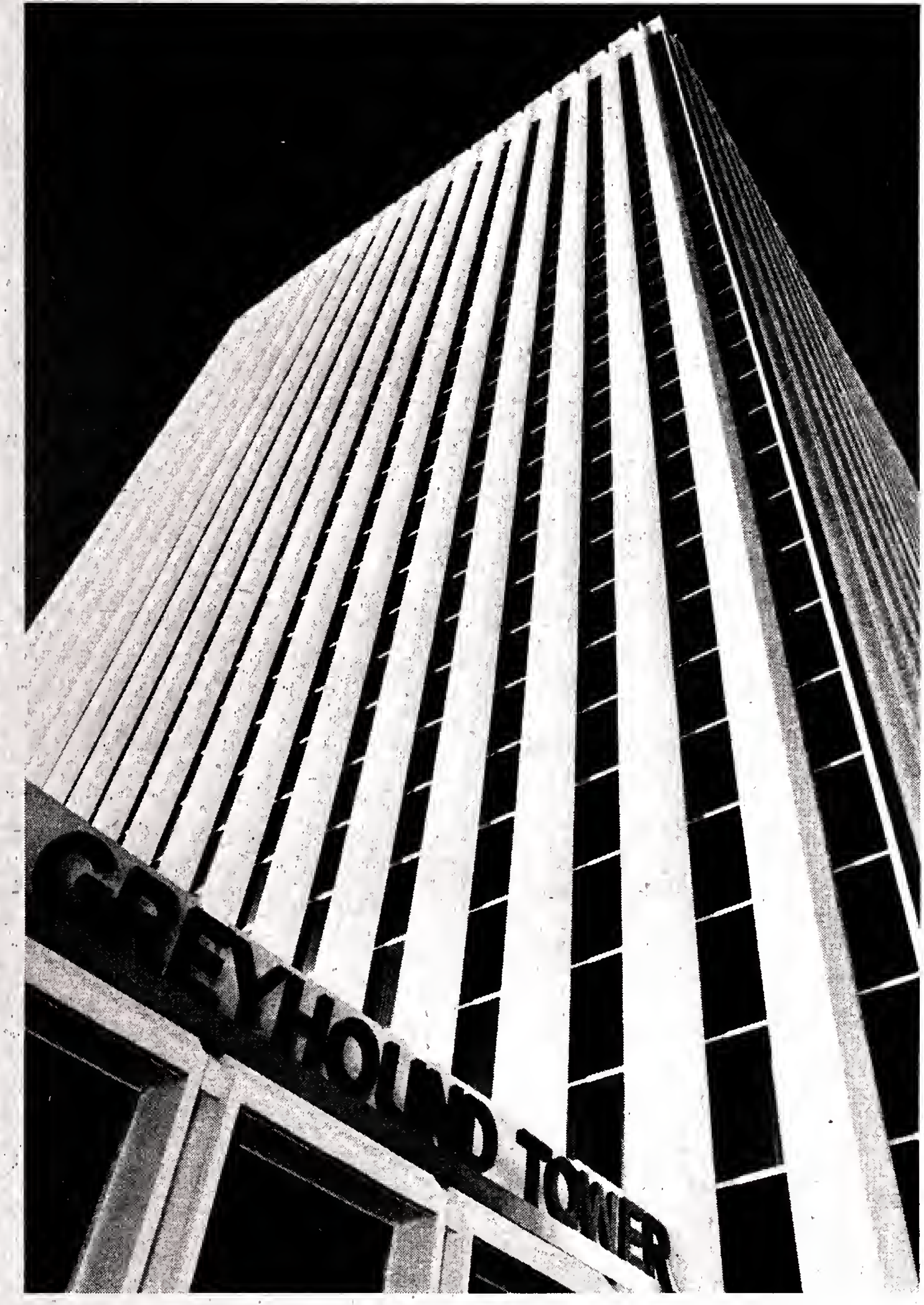

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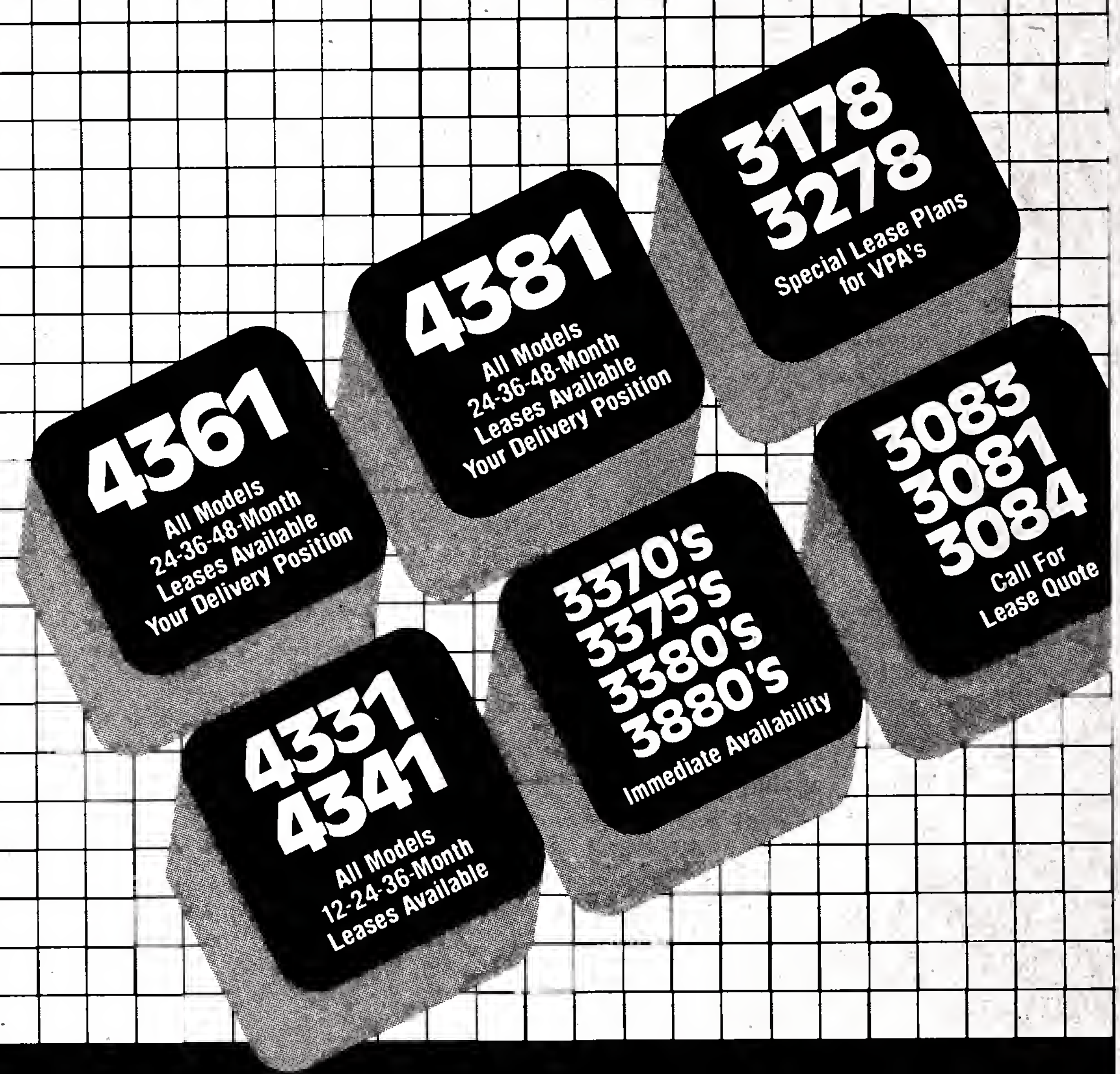

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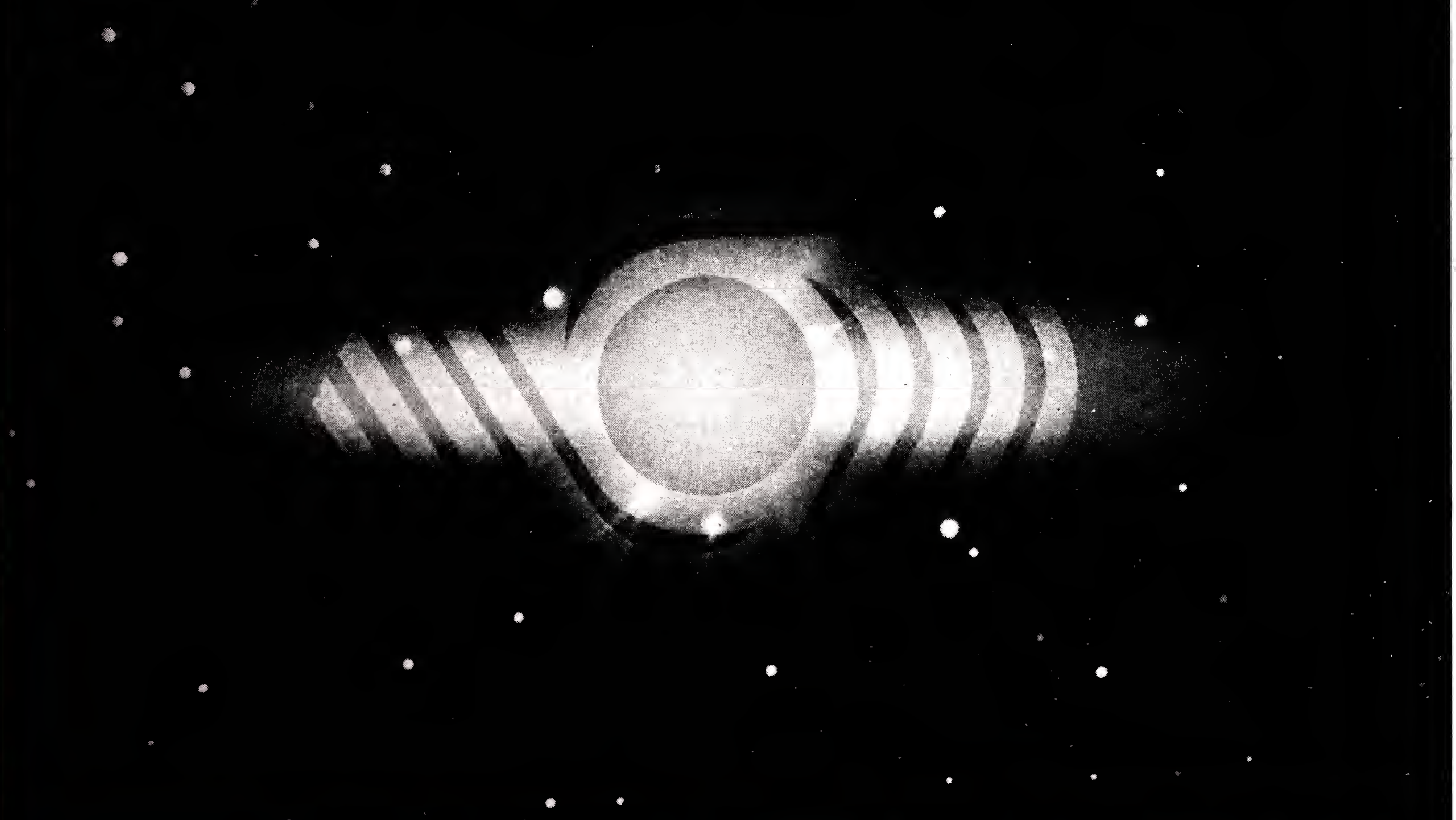

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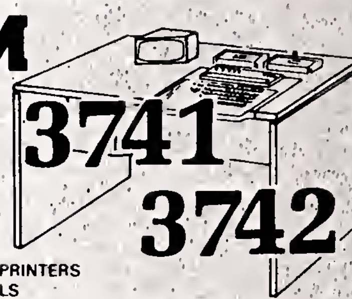

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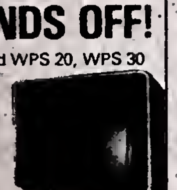

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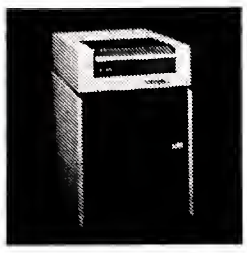

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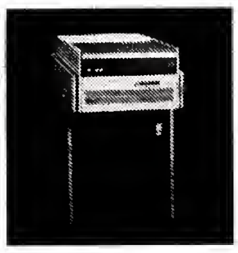

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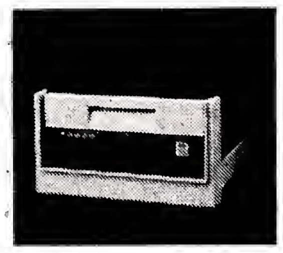

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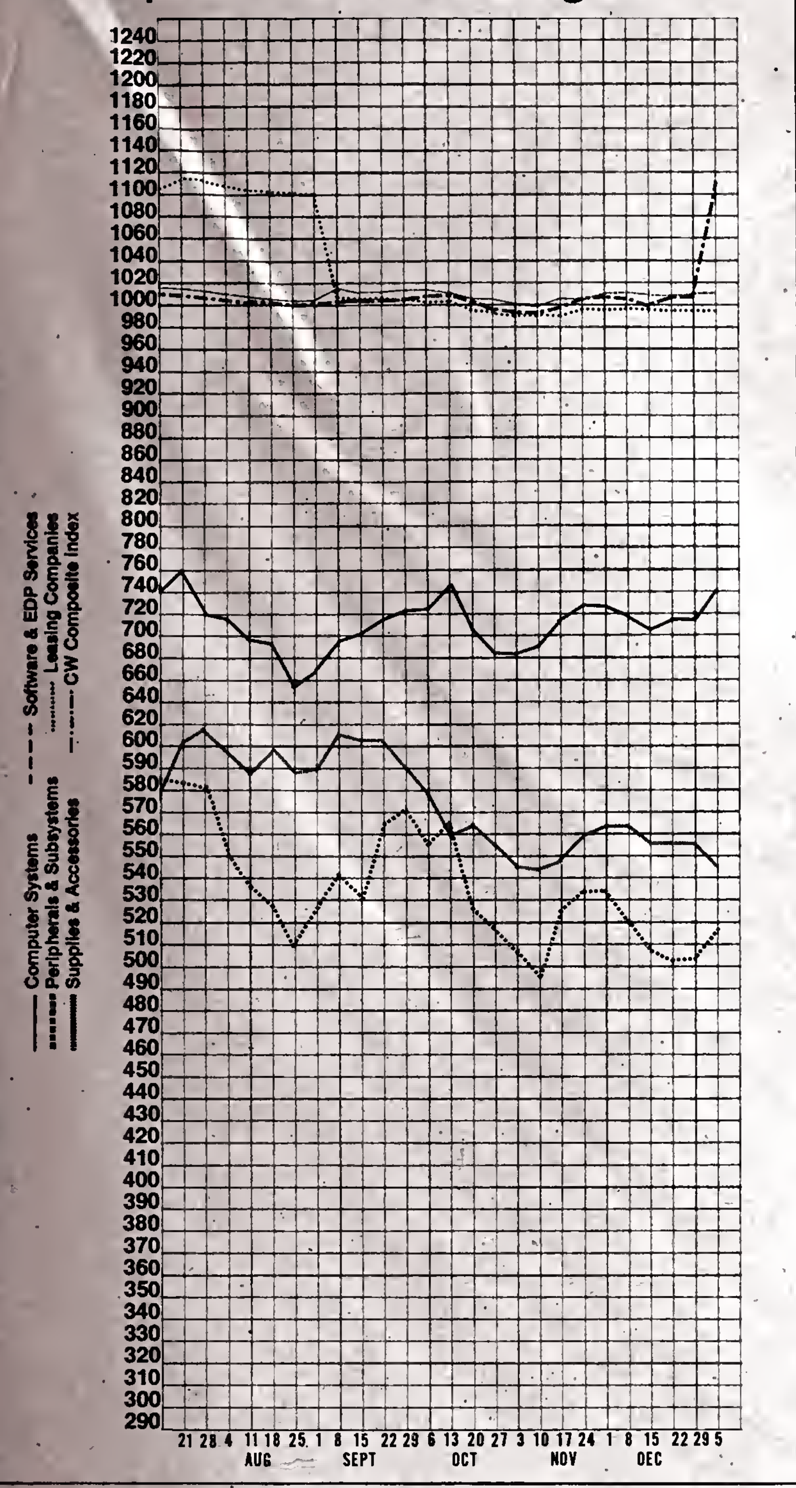

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CLOSING PRICES WEDNESDAY, JANUARY 4, 1984

COMPUTER SYSTEMS

EXCH		1983-84 RANGE (1)	CLOSE JAN 4 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	11- 24	15 3/4	+1 1/4	+8.6
O	ALTOS COMPUTER SYST	8- 28	11 1/2	+1 1/2	+15.0
A	AMDAHL CORP	9- 30	18 5/8	+ 5/8	+3.4
O	APPLE COMPUTER INC	18- 63	27 7/8	+3 5/8	+14.9
N	AT&T	60- 70	64 3/8	+1	+1.5
N	BURROUGHS CORP	28- 58	50 1/8	+ 3/8	+0.7
O	COMPUTER AUTOMATION	6- 17	7 3/4	+1 1/4	+19.2
A	COMPUTER CONSOLES	8- 26	20	+ 1/4	+1.2
N	CONTROL DATA CORP	21- 62	46	+2	+4.5
O	CONVERGENT TECHNOL	18- 41	25 5/8	+ 1/2	+1.9
N	CRAY RESEARCH INC	20- 57	56 1/8	+2 1/4	+4.1
N	DATA GENERAL CORP	10- 41	39 3/8	+6 1/2	+19.7
N	DATAPOINT CORP	11- 36	28 7/8	+1 5/8	+5.9
N	DIGITAL EQUIPMENT	62-132	73 1/2	+2 7/8	+4.0
A	EECO INC	6- 16	13 7/8	+ 1/4	+1.8
N	ELECTRONIC ASSOC.	5- 15	7 5/8	+1	+15.0
N	FLOATING POINT SYST	16- 44	36 3/8	+ 7/8	+2.4
N	FOXBORO	22- 47	35 3/4	+ 5/8	+1.7
O	GENERAL AUTOMATION	3- 16	11 1/8	+ 1/8	+1.1
N	GOULD INC	26- 44	32 1/4	+1 1/8	+3.6
N	HARRIS CORP	20- 51	40 5/8	+ 3/8	+0.9
N	HEWLETT-PACKARD CO	22- 48	43 1/2	+1	+2.3
N	HONEYWELL INC	60-138	132 1/2	-5 1/4	-3.8
N	IBM	57-134	123 7/8	+ 1/4	+0.2
O	IPL SYSTEMS INC	5- 14	6	+ 1/2	+8.0
N	M/A-COM INC	19- 35	19 7/8	+ 5/8	+3.2
O	MAGNUSON COMP SYSTS	1- 5	3/8	- 1/8	-25.0
N	MANAGEMENT ASSIST	7- 19	17 3/4	- 1/2	-2.7
N	MATSUSHITA ELEC(ADR)	47- 86	88 1/4	+4 3/4	+5.8
N	MODULAR COMPUTER SYS	6- 18	8 1/8	+ 1/2	+6.5
N	MOHAWK DATA SCI	10- 19	15 1/4	+ 3/8	+2.5
N	MOTOROLA INC	82-148	135 5/8	+3 1/8	+2.3
N	NAT'L SEMICONDUCTOR	15- 60	16 1/4	- 1/2	-2.9
N	NCR	38-136	127 3/4	+4 7/8	+3.9
N	PERKIN-ELMER	17- 37	29 7/8	+1	+3.4
N	PRIME COMPUTER INC	11- 30	17 7/8	+1	+5.9
N	SPERRY CORP	21- 48	47 5/8	+ 5/8	+1.3
O	TANDEM COMPUTERS INC	14- 40	36 5/8	+1 1/4	+3.5
N	TANDY CORP	34- 85	40 1/4	-2 3/4	-6.3
O	TELEVIDEO SYSTEMS	14- 41	15 7/8	- 7/8	-5.2
O	TELXON CORP	9- 16	10 3/4	- 1/4	-2.2
N	TEXAS INSTRUMENTS	71-176	141 3/4	+2 1/2	+1.7
A	ULTIMATE CORP	8- 24	18 1/2	+2 5/8	+16.5
O	VECTOR GRAPHICS INC	2- 14	1 7/8	- 1/8	-6.2
A	WANG LABS "B"	13- 42	36 1/4	+3 1/4	+9.8
A	WANG LABS "C"	11- 42	36 5/8	+3 3/8	+10.1
N	XEROX CORP	35- 52	50 5/8	+ 3/8	+0.7

LEASING COMPANIES

EXCH		1983-84 RANGE (1)	CLOSE JAN 4 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	11- 35	33 3/4	- 1/4	-0.7
N	COMDISCO INC	7- 42	20 1/8	+1 3/4	+9.5
O	CONTINENTAL INFO SYS	3- 18	8 1/2	-1 1/4	-12.8
N	DPF INC	5- 15	13 3/4	- 3/8	-2.8
N	U.S. LEASING	18- 47	35	- 5/8	-1.7

COMPONENTS

EXCH		1983-84 RANGE (1)	CLOSE JAN 4 1984	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO DEV	13- 35	35 1/8	+3 1/4	+10.1
O	ADV'D SEMICONDUCTOR	12- 37	36 1/2	+4 1/4	+13.1
N	ANALOG DEVICES INC	18- 42	38 1/2	-1	-2.5
O	ANALOGIC CORP	20- 27	24 1/4	+3 1/2	+16.8
N	APPLIED MAGNETICS CP	19- 37	26 1/2	-1 1/2	-5.3
N	TERADYNE	14- 38	37	+2	+5.7

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		1983-84 RANGE (1)	CLOSE JAN 4 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 8	3 1/4	-1	-23.5
O	ADVANCED SYSTEMS INC	6- 22	20 3/4	+ 3/4	+3.7
O	AGS COMPUTERS INC	7- 32	29	+2	+7.4
O	AMERICAN SOFTWARE	17- 31	19	+ 3/4	+4.1
N	ANACOMP INC	6- 23	6 3/4	-1	-12.9
O	ANALYSTS INTL CORP	5- 20	11 3/4	+ 1/8	+1.0
A	APPLIED DATA RES.	8- 37	28 5/8	- 5/8	-2.1
O	ASK COMPUTER SYSTEMS	6- 21	17 1/2	+ 1/2	+2.9
B	ASTRADYNE COMP IND	1- 7	2 3/8	+ 1/8	+5.5
N	AUTOMATIC DATA PROC	21- 44	35	+ 1/2	+1.4
O	CGA COMPUTER ASSOC	5- 17	12 5/8	- 1/2	-3.8
O	COMPUTER ASSOC INT'L	6- 35	27	+4 1/4	+18.6
O	COMPUTER HORIZONS	8- 20	13 3/4	+ 1/2	+3.7
O	COMPUTER NETWORK	4- 10	6 5/8	+ 1/4	+3.9
N	COMPUTER SCIENCES	11- 23	19 7/8	+ 1/2	+2.5
O	COMPUTER TASK GROUP	8- 22	15	- 1/4	-1.6
O	COMPUTER USAGE	2- 22	13 1/4	+1	+8.1
O	COMPUTONE SYSTEMS	5- 38	8 1/4	+2	+32.0
O	COMSERV CORP	5- 20	5 7/8	+ 1/8	+2.1
O	COMSHARE	7- 14	13 5/8	+ 1/2	+3.8
N	CULLINET SOFTWARE	12- 50	41	-1	-2.3
O	CYCARE SYSTEMS INC	8- 27	19 1/4	+1 1/2	+8.4
N	ELECTRONIC DATA SYST	10- 42	33 1/4	-2 1/8	-6.0
O	HOGAN SYSTEM INC	19- 53	22 1/4	+1 3/4	+8.5
N	GENERAL ELECTRIC CO	45- 59	58	+ 3/8	+0.6
N	GTE CORP	39- 48	43	- 1/4	-0.5
N	INFORMATICS INC	10- 34	19 3/4	0	0.0
O	INFOTRON SYSTEMS COR	25- 43	36 3/4	0	0.0
O	KEANE ASSOCIATES	4- 15	7 3/4	+1 1/2	+24.0
A	LOGICON	8- 31	29 7/8	+ 3/8	+1.2
O	MCI COMMUNICATIONS	13- 34	15 3/8	+1	+6.9
O	MNGT. SCI AMER INC	8- 33	27 3/4	+1 1/2	+5.7
O	MATHEMATICAL APP GRP	10- 22	10 1/2	0	0.0
O	MICOM SYSTEMS INC	25- 50	42 3/4	-1	-2.2
O	MONCHIK-WEBER CP	8- 22	8	+ 1/4	+3.2
O	NATIONAL DATA CORP	5- 26	19 3/8	-1 1/2	-7.1
O	ON-LINE SOFTWARE INT	17- 27	17 1/2	-2	-10.2
O	PANSOPHIC SYSTEMS	8- 30	20 3/4	+1	+5.0
N	PLANNING RESEARCH	6- 21	16 7/8	- 1/2	-2.8
O	POLICY MGMT SYSTS CP	15- 35	29 5/8	+ 5/8	+2.1
O	PROGRAMMING & SYS	1- 8	5 1/4	+ 1/2	+10.5
O	REYNOLDS & REYNOLD	17- 53	37 3/4	-4 1/4	-10.1
O	SEI CORP	11- 34	26 1/8	+1 5/8	+6.6
O	SHARED MEDICAL SYST	13- 43	33 5/8	+1 3/8	+4.2
O	SCIENTIFIC COMPUTERS	6- 14	11	- 1/2	-4.3
O	SOFTWARE AG	5- 17	11 3/4	- 1/4	-2.0
N	TYMSHARE INC	12- 30	21	+1 1/8	+5.6
A	URS CORP	5- 18	13 3/4	+ 1/4	+1.8
N	WYLY CORP	7- 17	10 5/8	- 3/8	-3.4

PERIPHERALS & SUBSYSTEMS

EXCH		1983-84 RANGE (1)	CLOSE JAN 4 1984	WEEK NET CHNGE	WEEK PCT CHNGE
P	AM INTERNATIONAL	2- 7	4 3/8	+ 5/8	+18.3
A	ANDERSON JACOBSON	9- 26	11	+ 7/8	+8.6
O	AUTO-TROL TECHNOLOGY	8- 29	22 7/8	- 1/8	-0.5
O	BANCTEC INC	7- 33	15	+ 1/4	+1.8
A	BEEHIVE INT'L	4- 15	7 3/4	- 5/8	-7.4
N	BOLT,BERANEK & NEW	5- 30	24 1/8	+ 1/4	+1.0
O	CAMBEX CORP	1- 4	1 3/8	- 1/8	-8.3
N	CENTRONICS DATA COMP	6- 28	14 5/8	+ 1/2	+3.5
A	CETEC CORP	4- 12	10 5/8	+1 1/8	+11.8
O	COGNITRONICS	2- 20	10 7/8	- 5/8	-5.4
O	COMPUTER DEVICES INC	1- 21	5/8	+ 1/8	+25.0
O	COMPUTER TRANSCEIVER	4- 12	3 3/4	- 1/4	-6.2
N	COMPUTERVISION CORP	19- 53	41 5/8	+1 1/8	+2.7
N	CONRAC CORP	16- 38	16 1/4	- 1/4	-1.5
A	DATAPRODUCTS CORP	16- 41	30 1/4	+ 3/4	+2.5
A	DATARAM CORP	5- 12	9 3/4	+ 1/8	+1.2
O	DATA SWITCH CORP	13- 41	29	-1	-3.3
O	DATUM INC	2- 17	8 3/8	+ 3/8	+4.6
O	DECISION DATA COMPUT	3- 16	11 1/2	+ 1/2	+4.5
O	DOCUTEL-OLIVETTI	11- 39	13 1/2	+2 1/4	+20.0
N	ELECTRONIC M & M	5- 11	8 1/4	+ 3/4	+10.0
O	ENDATA, INC	11- 16	11	+ 1/4	+2.3
O	EVANS & SUTHERLAND	18- 50	30 3/4	+ 3/4	+2.5
O	GANDALF TECHNOLOGIES	9- 22	9 1/4	- 1/8	-1.3
N	GEN'L DATA COMM IND	6- 32	31 7/8	+2 1/8	+7.1
O	GREAT SOUTHWEST IND	1- 6	3/4	0	0.0
N	HAZELTINE CORP	7- 31	26 1/4	+1 1/8	+4.4
O	ICOT CORP	3- 10	3 7/8	+ 3/8	+10.7
O	INFORMATION INTL INC	10- 22	13	+ 1/4	+1.9
O	INFORMATION SCIENCE	12- 17	14	+ 1/2	+3.7
O	INTEL CORP	11- 45	41 1/8	- 7/8	-2.0
O	IPL SYSTEMS INC	5- 14	6	+ 1/2	+9.0
A	LUNDY ELECTRONICS	7- 19	11 3/4	+1 1/8	+10.5
O	MEGADATA CORP	9- 15	12	- 3/4	-5.8
A	MSI DATA CORP	16- 37	20 1/4	+1 1/8	+5.8
N	NASHUA CORP	9- 29	24 3/8	+1 1/8	+4.8
O	NETWORK SYSTEMS CORP	8- 34	21 5/8	+1 5/8	+8.1
N	NO AMERICAN PHILIPS	47- 79	77 1/2	+ 1/4	+0.3
N	NORTHERN TELECOM LTD	22- 49	40	-1 1/4	-3.0
O	OMEX	2- 6	2 1/4	-1 1/4	-35.7
N	PARADYNE CORP	14- 30	17 3/4	-1 5/8	-8.3
A	PENRIL CORP	7- 14	12 3/4	+ 5/8	+5.1
O	PHOENIX AMERICAN INC	7- 17	12	0	0.0
N	PLESSEY CO (ADR)	26- 41	30 1/2	-1 1/4	-3.9
O	PRINTRONIX INC	23- 34	27 1/2	0	0.0
O	RAMTEK CORP	9- 26	11	- 1/8	-1.1
N	RAYTHEON CO	42- 58	44	- 5/8	-1.4
N	RECOGNITION EQUIP	4- 17	12 7/8	+ 3/4	+6.1
N	ROLM CORP	40- 80	50 1/8	- 7/8	-1.7
N	SANDERS ASSOCIATES	48-120	49 1/8	+ 1/4	+0.5
O	SCAN DATA	1- 3	3/4	+ 1/8	+20.0
O	SCAN-TRON CORP	12- 18	18	+1 1/2	+9.0
N	SCIENTIFIC ATLANTA	15- 23	14 3/4	-1	-6.3
N	STORAGE TECHNOLOGY	14- 33	14 3/8	+ 1/4	+1.7
O	SYKES DATATRONICS	4- 27	4 1/2	+ 3/8	+9.0
O	SYSTEMS & COMP TECH	26- 39	27 5/8	+ 5/8	+2.3
A	T BAR INC	7- 17	10	+1 1/8	+12.6
A	TAB PRODUCTS CO	8- 30	25 3/8	+1 1/4	+5.1
O	TANDON CORP	19- 35	20	- 1/2	-2.4
A	TEC INC	6- 12	10 3/4	+2 5/8	+32.3
N	TEKTRONIX INC	34- 87	76 1/4	+1 1/4	+1.6
N	TELEX	5- 32	26 3/8	+2 1/4	+9.3
O	TESDATA SYSTEMS CP	3- 17	9 1/8	+ 1/8	+1.3
N	TIMEPLEX INC	7- 29	20 1/8	-3 7/8	-16.1
O	VISUAL TECHNOLOGY	9- 26	18 1/4	0	0.0

SUPPLIES & ACCESSORIES

EXCH		1983-84 RANGE (1)	CLOSE JAN 4 1984	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN BUS PRODS	7- 23	21	-1 5/8	-7.1
N	BARRY WRIGHT	13- 33	31	- 1/2	-1.5
A	DUPLEX PRODUCTS INC	12- 27	26 3/4	+1 1/4	+4.9
N	ENNIS BUS. FORMS	6- 28	22 1/4	-1 1/4	-5.3
N	3M COMPANY	49- 90	84 1/8	- 7/8	-1.0
N	MOORE CORP LTD	26- 51	41 3/4	- 5/8	-1.4
O	STANDARD REGISTER	11- 34	31 1/4	-1	-3.1
N	WALLACE BUS FORMS	11- 33	29 1/2	- 1/2	-1.6

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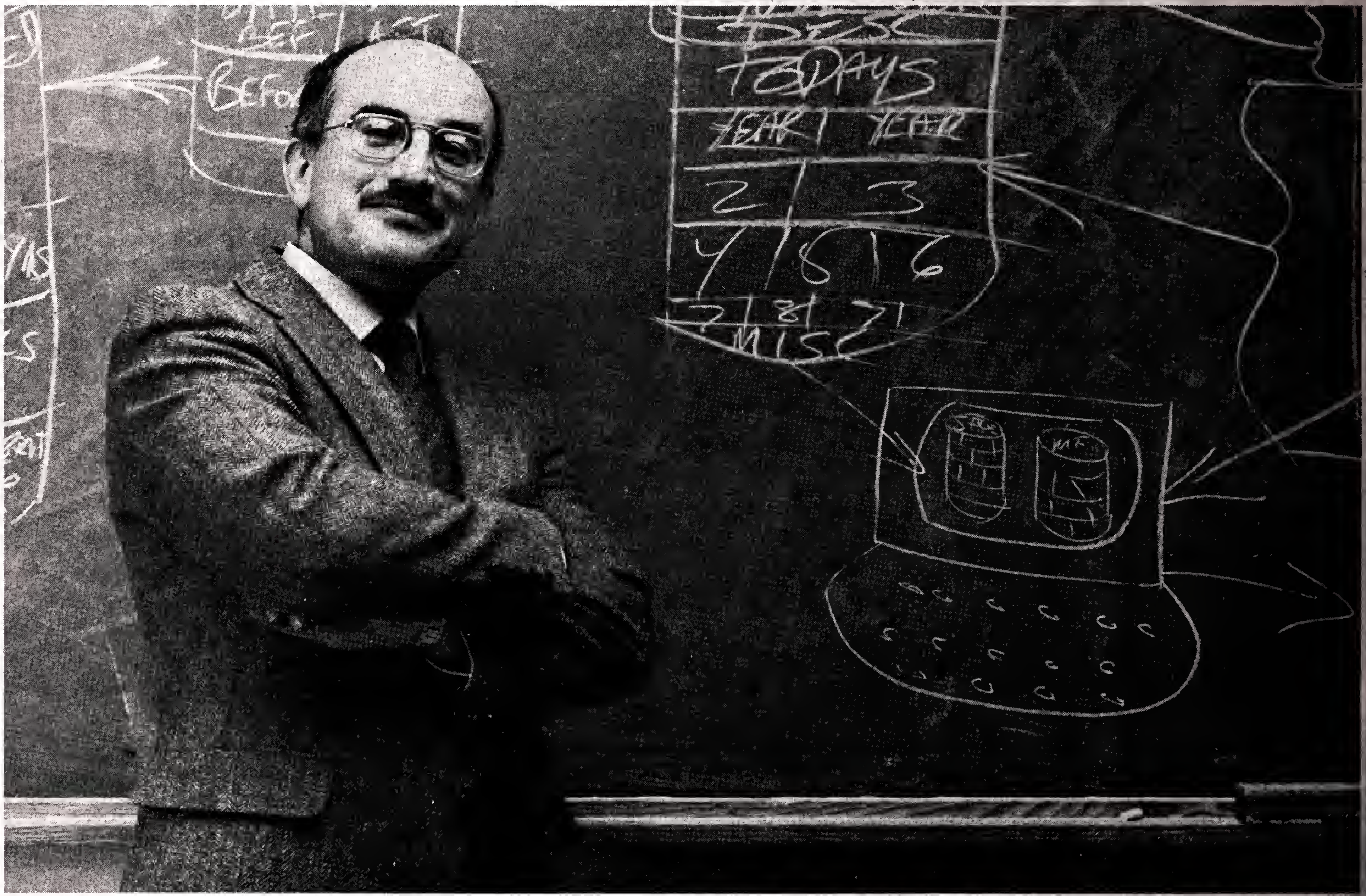

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